GAS JOURNAL, OCT. 2, 1946

VOL. 248 98th YEAR No. 4350

THE WALES MEETING

THE meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers last May was memorable. It marked coalition between North and South of the Principality. Hopes were bright, not least of them that B. J. Bell would shortly welcome, as President of the Association, members and friends to the meeting held at Porthcawl on Thursday of last week. That, however, was not to be. At the recent meeting all were sympathetic concerning the death of Mr. Bell, and all paid tribute to his untiring work for the Association itself and the Gas Industry in Wales—indeed, the Gas Industry in general. Wales marches on. The meeting of the Association last week was not an anti-climax. That is what Mr. Bell would have wished. On many occasions Porthcawl has proved an ideal venue for meetings of the Association. When members paid the town their first post-war visit last September, there was no local hotel accommodation, and those from a distance had to make their temporary abode at Bridgend. A few weeks ago the principal hotel on the sea front was re-opened, and peace-time comfort and convenience was thus restored. If representation of the North was not strong numerically it was not lacking in personality, and the aggregate numbers were well up to the average for a September meeting.

The lamented death of the President-Elect accelerated the elevation to the Presidential chair of Mr. E. M. Edwards, who, in addition to serving the Port Talbot Gas Department with conspicuous ability for many years, has for the last six years served the Association as its Honorary Secretary with distinction. In the normal course Mr. Edwards would have reached the chair some time ago, but on two occasions he stood aside for members who he felt should take precedence, and ultimately had to take office at comparatively short notice. Combined with ripe experience he has the advantage of youth, and if the corporate prospects of the Association are to be judged by the qualifications of its President, the Association is destined to have a very good year. Mr. Edwards follows, in Mr. O. P. Cronshaw, the first North Wales President, and will be in no danger of taking a narrow view, for he spent some of his earlier years under Mr. Ifan Jones at Holyhead, where, on the staff of a group of small undertakings, he acquired valuable experience. He hands over the duties of Secretary to Mr. Darrell Rees, another of the younger men of the Industry who has understudied him for some time in the office of Assistant Secretary.

The Wales and Monmouthshire Association has for many years recognized that it is too much to expect the Secretary to look after the social side as well as the business. For 25 years, therefore, the multitudinous duties of Social Secretary have been discharged by Mr. Joe Sadler, and it was fitting that his silver jubilee should be marked in tangible form. He has served under 21 Presidents, two Secretaries, and one Assistant Secretary, and he obviously finds real pleasure in his work. Of the Porthcawl meeting itself the two main items were the Paper on "Steam: Its Generation and Use in Gas-Works" by Mr. D. Hicks, who, on leaving the South Wales Fuel Efficiency Committee to take up work at the Fuel Research Station, received a parting gift from the Association; and the report by Mr. J. F. Rust on the progress of the recruiting campaign for the Gas Engineers' Guild. South Wales has always taken a keen interest in those aspects of gas engineers' welfare that are just outside the scope of the Institution's Charter, and the fact that the new Guild was already 85% strong before Mr. Rust's appeal for prompt support suggests that few if any of those eligible for membership now remain unaccounted for.

DISTRIBUTION PROBLEMS AT PERTH

ONE cannot fail to be impressed by the gravity of the problems with which chief executives have been confronted during the war years and are now faced by the turn-over to peace economy, complicated as they are with difficulties of obtaining plant and materials and overshadowed by the uncertain prospects of the coming nationalization. Introducing his Paper to the North British Association of Gas Managers, "Some Wartime Distribution Developments at Perth"—see later pages—Mr. Nicol Baird summed up most ably the general considerations which govern distribution in a rapidly growing urban undertaking under these conditions.

Gas sold in Perth increased by 10% from 1940 to 1941 and from 1941 to 1942 and by 5% from 1942 to 1943. It is not surprising, therefore, that there was considerable strain on the existing distribution system. Nor is this strain likely to be relieved in the near future either in Perth or in many other districts. The 20% increase in sales in the next 10 years visualized by the Heyworth Report does not, in Mr. Baird's opinion, by any means represent saturation point. "Indeed, it is only now that the Industry is about to reap the harvest originally sown over 100 years ago by William Murdoch." Development is more likely to be restricted by the limitations of the supplies of plant and appliances than by lack of demand. And the successful development of the Industry will be conditioned as much by the degree to which an adequate and satisfactory supply can be brought to the point of consumption as by the efficiency of production. Profits may be made in the retort house, but revenue is collected from the consumer.

An adequate and fairly constant pressure at the consumers' meter is no doubt the first element in consumer satisfaction. None of the physical or chemical properties of town gas is so

GAS JOURNAL, OCT. 2, 1946

VOL. 248 98th YEAR No. 4350

THE WALES MEETING

THE meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers last May was memorable. It marked coalition between North and South of the Principality. Hopes were bright, not least of them that B. J. Bell would shortly welcome, as President of the Association, members and friends to the meeting held at Porthcawl on Thursday of last week. That, however, was not to be. At the recent meeting all were sympathetic concerning the death of Mr. Bell, and all paid tribute to his untiring work for the Association itself and the Gas Industry in Wales—indeed, the Gas Industry in general. Wales marches on. The meeting of the Association last week was not an anti-climax. That is what Mr. Bell would have wished. On many occasions Porthcawl has proved an ideal venue for meetings of the Association. When members paid the town their first post-war visit last September, there was no local hotel accommodation, and those from a distance had to make their temporary abode at Bridgend. A few weeks ago the principal hotel on the sea front was re-opened, and peace-time comfort and convenience was thus restored. If representation of the North was not strong numerically it was not lacking in personality, and the aggregate numbers were well up to the average for a September meeting.

The lamented death of the President-Elect accelerated the elevation to the Presidential chair of Mr. E. M. Edwards, who, in addition to serving the Port Talbot Gas Department with conspicuous ability for many years, has for the last six years served the Association as its Honorary Secretary with distinction. In the normal course Mr. Edwards would have reached the chair some time ago, but on two occasions he stood aside for members who he felt should take precedence, and ultimately had to take office at comparatively short notice. Combined with ripe experience he has the advantage of youth, and if the corporate prospects of the Association are to be judged by the qualifications of its President, the Association is destined to have a very good year. Mr. Edwards follows, in Mr. O. P. Cronshaw, the first North Wales President, and will be in no danger of taking a narrow view, for he spent some of his earlier years under Mr. Ifan Jones at Holyhead, where, on the staff of a group of small undertakings, he acquired valuable experience. He hands over the duties of Secretary to Mr. Darrell Rees, another of the younger men of the Industry who has understudied him for some time in the office of Assistant Secretary.

The Wales and Monmouthshire Association has for many years recognized that it is too much to expect the Secretary to look after the social side as well as the business. For 25 years, therefore, the multitudinous duties of Social Secretary have been discharged by Mr. Joe Sadler, and it was fitting that his silver jubilee should be marked in tangible form. He has served under 21 Presidents, two Secretaries, and one Assistant Secretary, and he obviously finds real pleasure in his work. Of the Porthcawl meeting itself the two main items were the Paper on "Steam: Its Generation and Use in Gas-Works" by Mr. D. Hicks, who, on leaving the South Wales Fuel Efficiency Committee to take up work at the Fuel Research Station, received a parting gift from the Association; and the report by Mr. J. F. Rust on the progress of the recruiting campaign for the Gas Engineers' Guild. South Wales has always taken a keen interest in those aspects of gas engineers' welfare that are just outside the scope of the Institution's Charter, and the fact that the new Guild was already 85% strong before Mr. Rust's appeal for prompt support suggests that few if any of those eligible for membership now remain unaccounted for.

DISTRIBUTION PROBLEMS AT PERTH

ONE cannot fail to be impressed by the gravity of the problems with which chief executives have been confronted during the war years and are now faced by the turn-over to peace economy, complicated as they are with difficulties of obtaining plant and materials and overshadowed by the uncertain prospects of the coming nationalization. Introducing his Paper to the North British Association of Gas Managers, "Some Wartime Distribution Developments at Perth"—see later pages—Mr. Nicol Baird summed up most ably the general considerations which govern distribution in a rapidly growing urban undertaking under these conditions.

Gas sold in Perth increased by 10% from 1940 to 1941 and from 1941 to 1942 and by 5% from 1942 to 1943. It is not surprising, therefore, that there was considerable strain on the existing distribution system. Nor is this strain likely to be relieved in the near future either in Perth or in many other districts. The 20% increase in sales in the next 10 years visualized by the Heyworth Report does not, in Mr. Baird's opinion, by any means represent saturation point. "Indeed, it is only now that the Industry is about to reap the harvest originally sown over 100 years ago by William Murdoch." Development is more likely to be restricted by the limitations of the supplies of plant and appliances than by lack of demand. And the successful development of the Industry will be conditioned as much by the degree to which an adequate and satisfactory supply can be brought to the point of consumption as by the efficiency of production. Profits may be made in the retort house, but revenue is collected from the consumer.

An adequate and fairly constant pressure at the consumers' meter is no doubt the first element in consumer satisfaction. None of the physical or chemical properties of town gas is so

highly prized in the kitchen as a constant and adequate pressure at the burner. Mr. Baird does well, we think, in criticizing the Report of the Institution Committee on Gas Quality for its want of clarity and emphasis on this point. The Committee suggested a minimum supply pressure of 3 in.w.g. and a tolerance of 2 in. Something better than this would appear to be necessary "in order that a reasonably large, as well as consistent, heat input might be ensured for every appliance attached to the supply system." There would also appear to be room for a decision about the maximum pressure desirable at the inlet to individual services.

It will be remembered that Mr. H. J. Escreet urged once again (I.G.E. Comm. No. 259) the advantages of the service governor, enabling mains to operate with greater pressure drops without causing variations in pressure at the consumer's meter. And the Heyworth Report recommended governors at individual meters or individual appliances. The scheme outlined in Mr. Baird's Paper may be taken as a step towards the ultimate arrangement of individual service and/or appliance governors of a simple but effective form, by which means alone, without re-servicing and re-carcassing old property, is it possible to guarantee to maintain at every appliance the most satisfactory heat input. The interim arrangement is that of district governors with boosting to moderate pressures in the trunk mains, for which purpose the area was divided into five districts, the divisions themselves having been dictated by the necessity for "valving-off" to provide against air-raid damage. The Author described fully the apparatus installed. Suffice it to say here that it succeeded in dealing with the greatly increased load in spite of the growing inadequacy of holder capacity.

The design of this apparatus required the compilation of accurate statistical information relating to the demand for gas on various parts of the system at different times of the day, month and year. Anyone who has tackled a problem of this sort knows how seldom such information is available and how difficult it is to get it. For instance, in Perth it was found that at one point "gas was flowing rapidly up one side of a main thoroughfare merely to flow back again——on the other side."

To sum up then, if we have Mr. Escreet's solution of the problem in the new town, Mr. Baird shows how nearly the ideal may be reached in the conditions as they present themselves in an old-established district of gas supply.

TAR SURFACE DRESSINGS

THE overtaking of the heavy arrears of maintenance of roads is, to-day, the most urgent task of highway authorities, and there is no doubt that tar surface dressing provides a most excellent means for the maintenance of all types of road. This was, in fact, the theme of a talk on Monday last by Mr. W. E. Cone, of the B.R.T.A., at a meeting with surveyors held at Cambridge. His main contention was the need to revise and bring up to date old-fashioned methods of surface dressing which are not in accord with modern needs; those responsible for surface dressing must realize the impediments to successful work from a continuance of the old methods. As the Author pointed out, the test will be by results; and the information gained by experiment and experience is available to all. Evidence of the value of modern methods of surface dressing is forthcoming from the long life obtained in the treatment of large areas of trunk and main roads which are still in good condition after periods of from six to eleven years. In all cases of good surface dressing a minimum life of three years should follow automatically. Moreover, with modern practice, surface dressing operations can be carried out speedily with the minimum of inconvenience to traffic. In this work, the B.R.T.A. has made a constructive contribution by its joint experimental work with the Department of Scientific and Industrial Research and the Ministry of Transport. The whole trend of the British Road Tar Association's development work has been to reinforce the importance of the scientific approach to road-making, to stimulate improvements, and to ensure the production of the best tar and its most efficient utilization for the construction and maintenance of roads. The need for a recognized code of practice of surface dressing is indisputable. Too often one finds that little, or no, regard is paid to plant and equipment, and it would be an interesting speculation why in such work the general adoption of modern methods—the use of well-designed mechanical sprayers and mechanical grit feeders—has made relatively slow progress. Modern methods ensure uniform distribution and spread of both tar and chippings and they expedite this essential work of road maintenance. And throughout there should be the closest co-operation between user and supplier of the materials.

"BRITAIN CAN MAKE IT"

ON Tuesday of last week the King, accompanied by the Queen, opened the "Britain Can Make It" exhibition at the Victoria and Albert Museum, in the presence of a distinguished gathering. The exhibition was open to the public at 2 p.m.; by 4 o'clock more than 5,000 people had been admitted. A queue nearly a mile in length was then outside the building awaiting admission. The attendance was 15,000. We mention these facts and figures to indicate how keenly the public desire to avail themselves of brighter and better amenities at the earliest opportunity; how great and pressing is the demand; how anxious, after the dark and dreary war years, they are to glimpse the "things to come." The exhibition opens its doors cautiously to the availability of what it shows; nevertheless, it represents great achievements in the arts and industry. Not only is it a wonderful example of the art of modern display, but it is a heartening and enlightening vision of the transition from war to peace-time production, embodying in this production the results of accelerated research and application during the war period. The Chairman of the Council of Industrial Design, Sir Thomas Barlow, has expressed the Council's appreciation of the co-operation it has received from British industry in general, which put up for consideration by the Council's Selection Committee nearly 18,000 items. Of the goods shown, 36% are reported as available now for the home market and a further 15% will, it is understood, be ready by the end of this year. In this co-operation of which Sir Thomas Barlow spoke, the Gas Industry has played its part throughout the organization of this original and obviously important exhibition, and the wide range of gas appliances shown fits in extraordinarily well with the underlying conception of the exhibition and with the streamlined notions of to-day and to-morrow. British gas appliance manufacturers have indeed shown that "Britain can make it" from the point of view not only of the home market but of export trade.

"MANUAL OF GAS FITTING." By R. N. Le Fevre.—The entire first printing of this book has been sold. Negotiations are, however, proceeding for a further supply of paper and we confidently anticipate being able to reprint the work in the near future. We regret any disappointment occasioned, but can assure all that orders received for copies will have full attention and will be placed on a waiting list.

The Southern Association of Gas Engineers and Managers will hold its Annual General Meeting at Grosvenor House, Park Lane, at 2 p.m. on Oct. 29 when, following the ordinary business, Mr. Frank Dawson will deliver his Presidential Address.

Personal

Mr. F. TYNDALL, Assistant Engineer and Manager of the Hong Kong & China Gas Company, who has been on a visit to Britain, has returned to Hong Kong, having left by air on Sept 21.

* * *

Alderman J. S. PRIOR has been appointed Chairman of the Stamford & St. Martin's Gas Light & Coke Company in succession to the late Mr. Charles Dalton. Mr. H. E. DALTON has been appointed Vice-Chairman.

* * *

The Parkinson Stove Co., Ltd., announce that Mr. JACK ANSTEY, their Midland representative, has been appointed to cover Leicestershire, Derbyshire, Nottinghamshire and Rutland, in addition to the area in which he already represents the Company. He will, however, no longer be contacting gas undertakings in Shropshire, this county in future being handled by Mr. ROBIN WILSON and Mr. ERIC CULSHAW, who cover the West Midlands. Lincolnshire will be taken over by Mr. CECIL OGDEN, who already covers the Eastern Counties. These appointments have been made following the resignation of Mr. R. P. GIBB, who has accepted a senior appointment with the Air Ministry.

Obituary

The death has occurred at Alnwick (Northumberland) of Mr. CHARLES TURNBULL, Secretary of the Alnwick Gas Company. He was 78 years of age and joined the Company 54 years ago, as Assistant to his father who was then Secretary. In 1902 he became Secretary and in 1931 was appointed a Director.

* * *

The death occurred at Raynes Park on Sept. 22 of Mr. H. J. INGRAM, who for almost 40 years held executive positions with Alexander Duckham & Co., Ltd., Lubrication Technologists. For more than 20 years, until he retired in 1941, he was their Chief Engineer. Before taking up that appointment he was in charge of Duckham's Midland Sales Office at Birmingham.

Wales and Monmouthshire Association

THE Autumn General Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers was held at the Grand Pavilion, Porthcawl, on Sept. 26. The President, Mr. O. P. Cronshaw (Rhyl), was in the chair.

Councillor **F. G. Knott,** Chairman of the Parks and Entertainments Committee of the Porthcawl Urban District Council, extended a civic welcome to the Association, whose importance, he said, was more than ever stressed by the question of nationalization. His Council had recently been told by Mr. D. S. Davies, their Engineer and Manager, of the gas grid developments likely to take place in South Wales, and they were glad to know that the Gas Industry had such skilled men to guide them in the work they would have to face in the near future.

The **President,** in acknowledging the welcome, said this was by no means their first visit to Porthcawl, and he hoped it would not be the last. They were always glad to do their best, and they would continue in the same spirit whether nationalization came or not. He welcomed to the meeting Alderman H. Griffiths, Chairman of the Port Talbot Gas Committee, Mr. D. Hicks, of the South Wales Fuel Efficiency Committee, Dr. A. B. Badger, Manager of the Federation of Gas Employers, Mr. Evan Rees (Wandsworth), Mr. W. H. Johns, and Mr. Wood (Bombay Gas Company). He added that apologies for absence had been received from Mr. G. C. Pearson, President of the Institution of Gas Engineers, Mr. J. R. W. Alexander, General Manager of the British Gas Council, Mr. W. J. Smith, Mr. R. S. Snelling, and Mr. J. H. Canning.

Death of the President-Elect

The **President** then referred with sorrow to the death of three members since the last meeting. It was with special regret that he had to refer to the death of Mr. B. J. Bell (Cardiff), who was to have been installed as President at that meeting. At the Prestatyn meeting in May he fulfilled his duties with skill and attention. He had been a stalwart of the Association, and it was a matter for deep sorrow that he had not lived to take the Presidential chair. A few weeks ago they suffered another loss by the death of Mr. Owen Jones (Holyhead), a young and promising man in the Industry. They had also lost by death another member in the person of Mr. H. H. Camden.

The members stood in silence as a mark of sorrow at the loss of these members.

On the proposition of Mr. W. T. Kenshole, seconded by Mr. H. Blythe, Mr. A. L. Thomas (Haverfordwest) was elected a Member, and Messrs. E. Smith (Llanelly), P. Davies (Stockport), W. A. McCulloch (Birkenhead), and C. A. Josiffe (Cheadle Hulme) were elected Associates.

The Gas Engineers' Guild

Mr. **J. F. Rust** (Newport) drew the attention of those members of the Association who were Members or Associates of the Institution of Gas Engineers to the formation of the Gas Engineers' Guild, to which reference had been made recently in the technical Press. Gas engineers in Wales and Monmouthshire had been interested in the movement for many years. The present President and the President-Elect had worked hard for it, and it now had the blessing of the members of the Institution. Under its Royal Charter the Institution was precluded from dealing in any way with the conditions of service of gas engineers, either with regard to employment, pensions, or salary, and the only way to meet the situation was to form a new organization; and the Gas Engineers' Guild was now in course of formation. Their President took the chair at the original meeting and had taken a big part in its formation, and they now asked for quick support from all members who were eligible. He felt there was no need for him to stress the importance of prompt enrolment in view of the possibilities of a change in ownership of the Industry. Nationalization was threatened within the next 12 months, and they appealed for support as quickly as possible. They were already about 85% strong in Wales and Monmouthshire, and throughout the country the response had been very good.

The **President** endorsed Mr. Rust's appeal, particularly in view of what might be a new set-up in the Industry.

The **President** announced that the Council of the Association was about to consider a revision of the rules. The proposed revisions would be circulated to members and would come before the next annual meeting in May of next year.

Election of Officers

The **President** proposed, with great pleasure, the election of Mr. E. M. Edwards (Port Talbot) as President for the ensuing year. Mr. Edwards had sat on the platform for a number of years in the capacity of Secretary, and no one could have done the job better. It would be with some feeling of regret that they would lose his services as Secretary, but they would welcome him as President, and the way he had done his secretarial work was sufficient evidence that he would make an excellent President.

Mr. **W. Clark Jackson** (Neath), in seconding, said it was a long time since Mr. Edwards came to him as a small lad with a cherubic face in the 1914-18 war. From the first he was impressed with his energy and capacity for work, and in his later years he had shown the results of concentration on the occupation he then took up. He had rendered excellent service to the Port Talbot undertaking, and however busy he had been he had always been willing to take on some other job.

On the proposition of Mr. Prosser Jones, seconded by Mr. Rowlands, the following officers were also elected: Senior Vice-President, F. Dupont (Brecon); Junior Vice-President, Darrell W. Rees (Pembroke); Secretary, Darrell W. Rees; Members of Council, F. Boardman (Cardiff) and J. Powdrill (Pontypool); Auditor, A. D. Howells (Abergavenny).

The **President** then inducted Mr. Edwards as his successor.

Mr. **Edwards,** in returning thanks, said his connexion with the Association dated back to 1923, when he first became a Student Member. He felt he owed a debt of gratitude to the Association, and it was because of that gratitude that, when he was asked to take the office of Secretary, he undertook to do what he could. During his six years as Secretary he had made many friends, and his debt to the Association was much greater than anything the Association owed to him. He was grateful to Mr. Clark Jackson for all his encouragement throughout the past 30 years, and also to Mr. Ifan Jones, of Holyhead—who had suffered a sad blow in the death of his son, and who was not present at that meeting—under whom he served for some years.

Presentation to Mr. Cronshaw

His first pleasing duty as President, continued Mr. Edwards, was to present a silver salver to Mr. Cronshaw in token of the high regard in which the members had held him during his Presidential year. Mr. Cronshaw was the first President from North Wales, and his year of office had been a memorable one in the history of the Association, and the Prestatyn meeting in May was outstanding. Apart from meetings, his guidance during the year had contributed in great measure to the success of the Association, and as their representative on the

(*Continued on p.* 560)

Great Grimsby Centenary

The great part which the Gas Industry has played and will continue to play in the development of Grimsby was strikingly demonstrated at a luncheon given in the Town Hall, Grimsby, on Sept. 20 by the Directors of the Great Grimsby Gas Company to celebrate the completion of 100 years of efficient service to the town and district. Naturally the question of nationalization loomed largely in the speeches, and the hope was expressed that if nationalization does come about the Government will as faithfully serve the different communities as had the gas undertakings as at present constituted. The Chairman and Managing Director, Mr. W. H. Wintringham, presided over a distinguished gathering, and "Mr. Therm" played a part in the proceedings, for a large illuminated sign bore the words "'Mr. Therm' bids you welcome."

Mr. F. B. RICHARDS (Chairman of the Woodall-Duckham Companies) was entrusted with the toast "The Town and Trade of Great Grimsby and District," and in doing so emphasized the excellent service which the Company had rendered to the town. Great Grimsby, he said, was one of the oldest Boroughs in the Kingdom, and its great fishing industry was established in 1858, with five trawlers. Great efforts had been made by the local administrators to advance the interests of one of the principal gateways to the sea, and in that work they had been ably assisted by Mr. Wintringham, Colonel J. Kennington (Engineer and Manager of the Great Grimsby Gas Company), and the other principal officials of the Company, which had done a grand job of work in giving an efficient service not only to the private residents but to the great industries of which they were all so proud.

The MAYOR OF GRIMSBY (Alderman W. Roberts), who first replied, recalled that the Great Grimsby Gas Company was sponsored by a Sheffield Company, and it was a coincidence that he (the Mayor) 40 years ago was sent from Sheffield by Messrs. Dixon to start the paper-making industry at Little Cotes. They had successfully come through the testing of war, and they were determined to make Grimsby a place fit for heroes to live in. In that work Colonel Kennington and his staff could co-operate and render great assistance.

Mr. CYRIL OSBORNE, M.P. for the Louth Division, also replied, and dealing with the question of nationalization said that it was only right they should make sure of the success of one experiment in nationalization before embarking on another. Colonel Kennington was a man they were all proud to call a friend. Efficiency and commercial morality had been the secret of the success of the Grimsby Gas Company, and that was strikingly shown by the fact whilst the price of coal had gone up the cost of gas was about the same. The Government should prove that nationalization of the coal industry was a complete success before turning to any other industry, and if it acted on these lines there was every prospect that the Company under whose auspices they were met would celebrate a second centenary. "The whole point we must force home to the next generation," he concluded, "is—an honest day's work for a fair day's pay."

Mr. A. E. SYLVESTER, Governor of the Gas Light and Coke Company and Chairman of the British Gas Council, proposed the toast of "The Great Grimsby Gas Company." During the past 100 years the country had seen some great industrial changes, and the industrial revolution which had taken place had altered the face of the country. To-day they were in the midst of a different kind of revolution, and no man knew where it would lead. Throughout the period under review the Grimsby Gas Company had survived, and was still going strong. It had now achieved its century of useful work, but if they believed what they were told they had only reached it in time. "A hundred years of public service"—the words quoted in the Centenary brochure—was a plain statement of fact. It was 100 years of achievement and progress, and behind it all was a hundred years of free enterprise. Mr. Sylvester asked the question—"Are we to be nationalized because we have been inefficient?" The answer was, "Certainly not." Hardly any industry had been so alive to change and had striven so well to meet modern conditions.

The CHAIRMAN, in the course of his reply, testified to the fact that there was a splendid spirit of *esprit de corps* running through the staff. They had not had any labour troubles, and nothing but goodwill prevailed. If the Company was nationalized nobody would be a penny better off than they were to-day, and they would not get a better gas service. Neither the rates nor the income tax would be smaller—in fact everything would tend the other way.

Colonel JOHN KENNINGTON received a great ovation on rising to propose "Our Parent Company—the Sheffield Gas Company." He traced the rise and progress of the Great Grimsby Company from the time that it was formed with a capital of £10,000, and recalled that all the original directors with the exception of one belonged to Sheffield. That exception was Lord Worsley, High Steward of the Borough of Grimsby.

Mr. R. HALKETT, Director of the Sheffield and District Gas Company, who replied, pointed out that the progress of the Grimsby Company was a typical example of the progress made in the Gas Industry.

"Britain Can Make It" Exhibition

Earlier in our issue to-day we have referred editorially in general terms to the "Britain Can Make It" Exhibition opened by the King at the Victoria and Albert Museum on Tuesday of last week. Opening the exhibition, the King said: "In the oversea markets, upon which our prosperity, our solvency, and our standard of life must depend in years to come, and also in our own home markets, our manufacturers will have to compete with a steady improvement in the design of foreign productions. Let us to-day set out to make British design a hall-mark of pre-eminence in the eyes of the world, as British materials and workmanship have long been. . . . The idea of the exhibition was conceived within a few days of the armistice with Japan. That is little more than a year ago, and as we look around us in this hall we can take pride in the speed of our change-over from the grim tasks of war to the creation of these many serviceable and attractive articles of peace. No country was more completely given over to war than ours. Yet we are, I believe, the first fighting country to create a peace-time exhibition of this kind and scope. Much hard work has gone into the preparation of all that we see around us; and I am proud to think that at a time when the difficulties of the war have by no means vanished our manufacturers and workers have so willingly made this effort to show what we can and hope to achieve in the happier future before us."

In this co-operative effort the Gas Industry and the manufacturers of gas-using equipment have played a prominent part and the appliances shown, as we have said in our previous note, "fit in extraordinarily well with the underlying conception of the exhibition and with the streamlined notions of to-day and to-morrow. British gas appliance manufacturers have indeed shown that 'Britain can make it' from the point of view not only of the home market but of export trade." Domestic equipment is displayed in special settings and in no fewer than 24 furnished living rooms and kitchens.

Included in the group of domestic equipment chosen for design value can be seen a pressed steel "Ajax" gas cooker by Sidney Flavel & Co., Ltd., which has a new design in burners, of the non-aerated or "neat" flame type which are silent in operation. Both hotplate and oven have these, in the latter operated by a tap which is incorporated in the thermostat above the oven door. The automatic folding plate-rack and splash-back folds down in one movement when not required, to form a useful table top. This latter useful feature is also seen in the Radiation "New World" 548 cooker, which has the added usefulness of being immediately available to the general public. Another streamlined design in attractive green and cream is the Cannon K.509. This has a front-operated oven thermostat and is finished in acid-resisting enamel.

The cream enamel Mark I cooker shown by Auto-Precision, Ltd., has aerated self-lighting dual burners and is designed without a plate-rack but flush-fitting to the wall. There is oven thermostatic control, and there is the "simmering-precision" of the taps.

Outstanding in attractiveness of design among the water heaters is the De La Rue Gas Development streamlined multipoint model which was described in the "JOURNAL" last week. The circulator shown by Radiation, Ltd., features neatness in size and ability to be incorporated into the existing hot water system. The Ascot multipoint heater can be fitted to serve kitchen sink as well as one or more wash-basins. Other attractive designs seen here were the G.L.C. 91 water heater, Ewart's sink heater, and the Ranalah multipoint sink heater which has a streamlined case fitting flush to the wall. This is pleasantly finished in cream enamel and has no external fittings such as taps and spout to spoil its line, and it needs no flue.

Misha Black designed Sidney Flavel & Co., Ltd.'s, "Vek 2" heater, which, in addition to modern simplicity of line, has a combination of luminious burner and convection heating. Radiation, Ltd., show a panel type fire of new design which is completely silent in use, and also a hearth-type "Silent-Beam" gas fire of attractive appearance, with luminous burners and a new form of radiant, giving the appearance of an incandescent mass of considerable depth.

Others are a portable "Zonex" heater and convection radiators by the Parkinson Stove Company, and two designs by Bratt Colbran, Ltd. These are a "Neat Mortimer" Portcullis flueless gas radiator for domestic use and for shops and hotels, which combines the glow of radiant heat with a high convected heat output, and, especially modern in construction, their Portcullis Pendennis gas fire, designed to fit flush into a tiled or marbled fireplace-opening, finished in polished rustless steel. This has a self-lighting tap, with flint ignition and a duplex gas burner to extinguish two of the four radiants if required.

Barralets, Ltd., show an attractive wash-boiler with wringer, of round shape, finished in green, with tubular base which can be used

in conjunction with the Auto Precision Mark III drying cabinet. This is constructed of lightweight rustless metal with eight movable plastic hanging rods and a rod to take coat hangers. The gas unit, which is thermostatically controlled for drying different kinds of garments, is totally enclosed and there is nothing here to damage delicate garments.

The "Compoflex" tubing, a new type of flex for portable gas appliances, is manufactured by Friedman-Athill. It will not absorb gas and is therefore odourless, combining high flexibility with safety.

Gas equipment is very noticeable in a tour of the Furnished Rooms Section. In Miss Edna Mosely's design for the kitchen of a cottage in a modern mining village can be seen a cooker by R. & A. Main, Ltd., a gas heated wash boiler by Wilson & Mathiesons, Ltd. (Radiation, Ltd.), and an Electrolux gas refrigerator. In the "luxury bathroom" designed by C. Entwistle, we are shown an Ascot gas water heater, and a De La Rue instantaneous multipoint gas water heater, serving bath, basins, and sink. And of course in the "kitchen in a large, well-appointed house," designed by Maxwell Fry and Jane Drew, the designers rely on gas for cooking and refrigeration, showing an Electrolux gas refrigerator and a gas range finished in white, on a special stand, by Radiation, Ltd.

The pleasant appearance, as well as the working efficiency, of all these models plays a great part in the charm and character produced in the rooms.

Stress is laid at the exhibition on the fact that all the designs on show are either immediately available or will be made so in a very short time.

Diary

Oct. 3.—Midland Counties Coke Association Central Committee, 2.30 p.m., King Edward House, Birmingham.
Oct. 4.—London and Southern District Junior Gas Association: Opening Meeting. Presidential Address. Gas Industry House, 7 p.m.
Oct. 5.—Scottish Junior Gas Association: Opening Meeting at Dunfermline. Presidential Address of Mr. T. R. Sawers.
Oct. 8.—National Federation of Gas Coke Associations: General Committee, 10 a.m., Gas Industry House.
Oct. 8.—British Gas Council, Gas Industry House, at 2.30 p.m.
Oct. 8.—Illuminating Engineering Society: Opening Sessional Meeting, School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, Presidential Address, J. S. Dow, 6 p.m.
Oct. 8.—Institution of Chemical Engineers: "The Removal of Phenols from Gas-works Ammoniacal Liquor," D. G. Murdoch and M. Cuckney. Apartments of the Geological Society, Burlington House, 5.30 p.m.
Oct. 9.—Domestic Development Committee, Gas Industry House, 2.30 p.m.
Oct. 11.—National Federation of Gas Coke Associations: National Technical Committee, Gas Industry House, 10.30 a.m.
Oct. 11.—Solid Smokeless Fuels Federation Technical Committee, Gas Industry House, 2.30 p.m.
Oct. 11.—Chemical Engineering Group: "Chemical Engineering in the Tar Industry," R. Scott. Apartments of the Geological Society, Burlington House, 5.30 p.m.
Oct. 12.—Midland Junior Gas Association: Joint Meeting with the Western Junior Gas Association at Gloucester. "Reconditioning a Five-million Waterless Gas Holder at Base," D. M. W. White.
Oct. 16.—London and Southern District Junior Gas Association: Visit to the Wembley Research Laboratories of the General Electric Company.
Oct. 17.—Solid Smokeless Fuels Federation: Executive Committee, 11.30 a.m., Dorchester Hotel, Park Lane, W.1.
Oct. 17.—Midland Association of Gas Engineers and Managers: Autumn General Meeting, King Edward House, Birmingham, 2.30 p.m.
Oct. 18.—Manchester District Association of Gas Engineers. Paper by H. Johnston, Bradford.
Oct. 21.—London and Counties Coke Association: Finance Committee, 10.30 a.m.; Executive Committee, 11 a.m.; Central Committee, 12 noon; Annual Luncheon, 1 p.m. for 1.15 p.m.; Annual General Meeting, 2.45 p.m. Grosvenor House, Park Lane, W.1.
Oct. 22.—Southern Association of Gas Engineers and Managers (Eastern District): "The Application of the Lockheed Principle to the Automatic Operation of a C.W.G. Plant," J. C. Herbert. Gas Industry House, 2.30 p.m.
Oct. 24.—Midland Junior Gas Association: Visit to the Yorkshire Copper Works, Leeds.
Oct. 29.—Southern Association of Gas Engineers and Managers: General Committee, 11 a.m. Luncheon, 12.30 p.m. Annual General Meeting and Presidential Address, Frank Dawson, 2 p.m. Grosvenor House, Park Lane, W.1.
Nov. 26-27.—Institution of Gas Engineers: Autumn Research Meeting.

The South-Western Gas & Water Corporation, Ltd., is paying on Oct. 23 an interim dividend on the Ordinary shares of 2% (actual) less income tax, in respect of the year ending Dec. 31, 1946.

For their summer outing the employees of Ascot Gas Water Heaters, Ltd., travelled by coach to Ramsgate where lunch was provided, and they enjoyed various forms of amusement throughout the day, including games and competitions on the beach, &c. The function was arranged by the Ascot Sports and Social Club.

Middleton Corporation's three prizes for essays by school children on the local gas-works in connexion with the recent centenary celebrations of the undertaking were won by pupils of the Rhodes Council School. Ellen Meekle, first prize winner, completed her story with the sentence: "It is much more interesting to use gas at home now know how it has been manufactured."

WALES AND MONMOUTHSHIRE ASSOCIATION

—Continued from p. 558

Council of the Institution he would further enhance the high degree of affection in which they held him.

Mr. **Cronshaw,** in acknowledgment, paid tribute to the work of the officers and particularly that of Mr. H. Blythe, Secretary of the North Wales Section.

Mr. **D. W. Rees** submitted the 36th annual report of the Special Purposes Section, which now consists of 10 local authorities and 23 companies. After recording an increased balance in hand, the report stated that it was desirable that an early meeting of the Section should be convened to consider whether it should or should not be continued in its present form.

On the proposition of Mr. J. Powdrill (Pontypool), seconded by Mr. J. F. Rust, the report was adopted.

Mr. **D. Hicks,** Officer in Charge of the Coal Survey Laboratory, Cardiff, on behalf of the South Wales Fuel Efficiency Committee, presented a Paper on "Steam: Its Generation and Use in Gas-Works." An abstract of the Paper, and the discussion, will be published in a later issue of the "JOURNAL."

Luncheon and Presentations

The official luncheon, to which ladies were invited, was held at the Grand Pavilion.

Dr. **A. B. Badger,** Manager of the Federation of Gas Employers, proposed the toast of "Porthcawl: Its Prosperity and Future," and Councillor **E. Thomas,** Chairman of the Porthcawl Gas Committee, who had returned from holiday especially for the occasion, responded.

Mr. **R. H. Sandon,** Secretary of the South Wales Fuel Efficiency Committee, proposed the toast of the Association, and referred to the excellent manner in which the Gas Industry had co-operated in the fuel efficiency movement.

The **President,** in responding, said South Wales was faced with substantial developments in the extension of old industries and the establishment of new ones, all of which would require increased quantities of gas. It was not generally known that the Gas Industry in South Wales had had some very big problems. Since war broke out in 1939 they had been asked to double, and treble, and in some cases quadruple their production of gas, and it spoke highly for the Industry that the necessary gas supply had been forthcoming.

The luncheon was also the occasion of two presentations. Mr. **W. Clark Jackson,** Secretary of the South Wales District of the British Gas Council, presented a silver cigarette casket to Mr. D. Hicks, of the South Wales Fuel Efficiency Committee, on the occasion of his departure to take up a more important appointment at the Fuel Research Station.

The **President,** on behalf of the members of the Association, presented a cheque to Mr. Joe Sadler to mark the completion of 25 years' service as Social Secretary.

Mr. **Sadler,** in expressing his thanks, said he had been very happy to serve under 21 Presidents, two Secretaries, and one Assistant Secretary. Whatever he had done had been a labour of love, and he was grateful to the two firms he had represented for giving him every encouragement and facility.

The afternoon was devoted to a display of Gas Industry films at the Grand Pavilion, followed by tea.

The golf competitions for the Dean Cup and the Upjohn Cup were played over the course of the Pyle and Kenfig Golf Club on Friday, and there was also a three-rink bowls match with the Porthcawl Municipal Bowling Club on the Griffin Park green, the Association losing by two rinks to one.

The golf results were as follows:

Upjohn Cup.—Medal round.—Trevor Morgan (Cardiff), 90−12=78; Francis Drake (Halifax), 85−7=78; Darrell Rees (Pembroke Dock), 82−4=78. Mr. Morgan won on the last 9 holes. Cup.—W. Clark Jackson, 86−6=80; Arthur Sadler, 91−9=82.

Dean Cup.—Bogey.—W. Clark Jackson, all square; G. H. Mills, 5 down.

Replicas were presented by the Parkinson Stove Co., Ltd., per Mr. Arthur Sadler (Newport).

The cups were presented to the winners by the President, Mr. E. M. Edwards.

Wartime Distribution Developments at Perth*

By NICOL BAIRD

Engineer and Manager, Perth

An unusually rapid expansion in the demand for gas has been the common experience of most gas undertakings during the past few years. The circumstances which have brought about this extraordinary development have at the same time created delays and difficulties in the supply of additional plant to meet the increased load.

In particular the addition of new gasholders during the years of war has not been a matter that could be lightly decided upon by the responsible persons controlling a gas undertaking, any more than by the appropriate Government Department, and although it has for long been generally agreed in gas-works practice that a total holder capacity equal to the maximum gas output for any 24 consecutive hours is desirable, few undertakings will have been so happily placed, while some undertakings which have been sufficiently provided for in respect of volume may not even yet be without difficulties in regard to the pressure available to meet the extraordinarily increased gas load. One method of obtaining the maximum value from existing storage capacity is described in some detail herein.

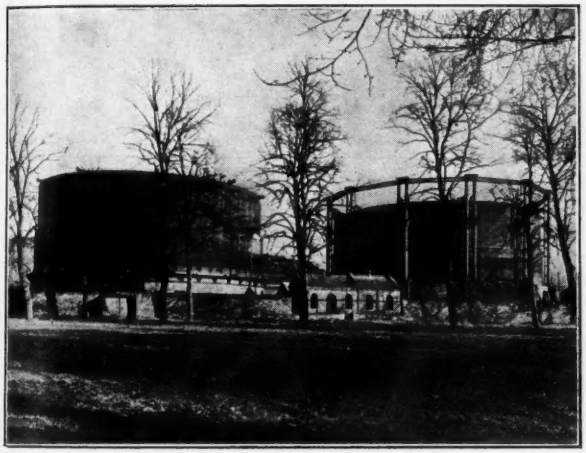


FIG. 1.—*Shore Gasholder Station*

The Report of the Committee of Enquiry on Gas Quality (I.G.E. Communication No. 249) laid emphasis on the desirability of maintaining sensibly constant pressures of gas supply at consumers' meters, because the evidence examined had manifestly demonstrated that the greatest number of complaints arose from excessive variations in gas pressure. The permissible tolerances recommended, however, seemed to contradict the emphasis that was placed on the desirability of maintaining consistent pressure conditions, and it is perhaps to be regretted that the terms of reference did not apparently suggest an investigation into the most desirable pressure which should be given at consumers' meters (taking into consideration differences in gas quality), in order that a reasonably large, as well as consistent, heat input might be ensured for every appliance connected to the supply system.

These latter remarks on gas pressure were originally written in 1944, when the notes for this Paper were first prepared. About 18 months later the Heyworth Report recommended the installation of governors at individual meters or at individual appliances, and urged that " in any main or in any pipe (between the main and meter) having an internal diameter of 2 in. or upwards, a pressure of not less than 2 in. in excess of the governed pressure " should be maintained.

The Heyworth Report did not, however, specify any maximum pressure on the inlet to individual services, and it would appear that that policy will still have to be decided upon. In the meantime there remains the alternative of having either small service or appliance governors made to operate on a wide range of supply pressures, in which case district or station governors would not be necessary except during boosting. The alternative method would be to retain the existing station or district governors to permit boosting the gas pressure moderately, in which case a very simple form of service or appliance governor would be effective, while the servicing of such governors, working under favourable conditions, would not be so difficult as those working under widely varying pressures. Moreover, apart from the simple construction of the governors themselves, there would not be the same necessity for insisting upon absolute cleanliness of the valves and seating if the inlet pressure variation was restricted to a few inches in excess of the governed pressure. It is also rather obvious that reliance on high pressure distribution is not *per se* so economic ultimately, although where the demand for gas has grown too speedily, the development of high pressure supplies has possibly been the simplest, quickest, and cheapest remedy for a short-term policy.

In either case it would still be necessary to use district or station governors when boosting to an intermediate or high pressure, and the Distribution Development Scheme outlined in this Paper may be taken to be a step towards the ultimate arrangement of having individual service and/or appliance governors of a simple but most effective form, by which means alone, without reservicing and recarcassing old property, is it possible to guarantee to maintain at every appliance the most satisfactory heat input.

With an annual development of up to 5% increased output, it would be reasonable to anticipate that provision for future extensions could, and would, ordinarily, be met by normal maintenance and improvement schemes financed by economical measures. After a period of years, however, when in some instances average increments of the order of 10%, or even more, have had to be met annually, it is not unreasonable to find shortcomings in any distribution system, particularly when, quite apart from financial aspects, there has been every desire and necessity to curtail plant extensions involving labour and material, which during the war years were both urgently required elsewhere, and which are now both again temporarily at a premium for equally urgent reasons.

The Heyworth Committee forecast an increase of 20% in the sales of gas within 10 years. Judged on the present progress rate of building additional manufacturing plant, and the time taken for political developments to be translated into practice, that forecast may be taken as a fair short term estimate, but not, as some may imagine, the estimated saturation point of the Gas Industry. It would rather appear, therefore, that for some years ahead yet, the development of gas supplies will only be restricted by the deliveries of plant and appliances. This view is greatly reinforced by the recently published Report on Domestic Fuel Policy by the Fuel and Power Advisory Council under the Chairmanship of Sir Ernest Simon, the implications of which are that the Gas Industry will not only remain, but will be expected and encouraged in every way to develop as a two-fuel industry to an extent out of all recognition to its present size. Indeed, it is only now that the Industry is about to reap the harvest originally sown over 100 years abo by William Murdoch.

It is basically important for the Industry that the development of methods of supply should march in step with the growing demand for town gas, and although the old maxim that " profits are made in the retort house " rings true to-day as it always has in the past, " profits," or, more appropriately, the successful development of the Industry, is equally dependent upon the adequacy and satisfaction of the supply to each and every consumer.

Technically, there are no unsurmountable difficulties in this particular sphere of distribution practice, and yet, taken as a whole, the Gas Industry has quite suddenly been overtaken and passed by political evolution. It is hoped that the description of the restricted wartime development scheme herein narrated will offer sufficient interest to stimulate further considerations and progress in distribution practice.

GEOGRAPHICAL AND HISTORICAL

Within the Burgh Boundaries of the City and Royal Burgh of Perth there is an area of 6.195 sq. miles, a residential population of some 38,000 inhabitants, and a network of some 66 miles of gas mains, which are depicted in Fig. 2. The source of gas supply is from the gas-works at Friarton, on the extreme right-hand bottom corner of the plate. On the top right-hand corner there is a further extension of the low pressure gas supply, outside the Burgh Boundary, some 3½ miles to Scone, and thereafter stretching a further 2 miles to the local airport.

In addition to the low pressure distribution system, there are also medium and high pressure gas supply lines to certain villages within 10 miles of the centre of the city. The total mileage of mains of all

* Paper to the North British Association of Gas Managers, Rothesay, Sept. 12, 1946.

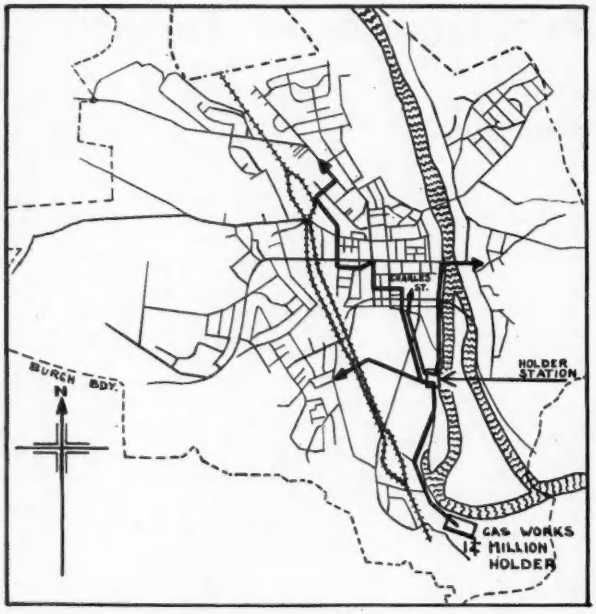


FIG. 2.—*Network of Mains within City Area*

sizes, including low, medium, and high pressure, amounts in all at present to 106 miles, and serves a total population of over 45,000. During the last financial year for which figures are available, the average consumption of gas per consumer was 45,814 cu.ft. per annum. The averages for the city and county separately are 43,691 and 63,863 cu.ft. respectively.

DISTRICT ANALYSIS OF CONSUMPTION PER CONSUMER, PER ANNUM, AT MAY 15, 1946

	Ordinary meters		Prepayment meters		Total	
	Cu.ft.	Therms.	Cu.ft.	Therms.	Cu.ft.	Therms.
1. City (Domestic)	33,142	140.9	40,169	170.7	37,782	160.6
2. City Total (Domestic and Industrial) ...	...	...	...	...	43,691	185.7
3. Scone (Domestic)	47,946	203.7	40,595	172.5	43,269	183.9
4. Bridge of Earn (Domestic) ...	57,076	242.6	51,974	220.9	53,676	228.1
5. Craigend (Domestic) ...	20,350	86.5	50,067	212.8	30,994	131.7
6. Almondbank (Domestic) ...	58,821	250.0	54,251	230.6	54,972	233.6
7. Methven (Domestic) ...	39,484	167.8	36,102	153.4	37,243	158.3
8. County Total (Domestic) ...	48,536	206.3	44,820	190.5	45,997	195.5
9. County Total (Domestic and Industrial) ...	...	...	...	...	63,863	271.4
10. Area of supply:						
(*a*) Domestic	...	...	...	...	38,669	164.3
(*b*) Total (Domestic and Industrial)	...	...	...	...	45,814	194.7

The annual development in the supply of gas to the area of supply over the 10 years ending May 15, 1944, is shown graphically in Fig. 3, while Fig. 4 not only shows how the rising gas consumption has outstripped progress in mainlaying, but also illustrates graphically the extraordinary further development in output of gas during the last two years.

From the latter illustration it will also be seen that there has been, during the lifetime of the Friarton Works, a steadily increasing demand for gas, but that in the period since the commencement of the recent war, the development has been greatly accelerated. Since the position has been slightly aggravated by a reduction in the declared calorific value from January 15, 1942, an appropriate correction factor has been applied, and the dotted lines show truly comparative curves.

(a) Gasholders

For the past 20 years the total holder capacity has been 2¼ million cu.ft., which is derived from two holders built respectively in 1888 and 1898, both in excellent condition, and each capable of storing ½ million cu.ft. of gas, and third holder, built in 1926, which has a maximum capacity of 1¼ million cu.ft. Not until two years ago was there experienced for successive months a *continuous* 24 hr. output exceeding 2 million cu.ft., so that the volumetric capacity of the three holders until that time was nominally adequate for the purposes of an undertaking of this size. In the following two years the maximum peak load, however, reached approximately 3 million cu.ft., and further development is quite certain.

In recent years, however, the pressures thrown by the two smaller holders have not been sufficient to meet the higher winter load requirements of the area, while only the third and fourth lifts of the third gasholder have been capable of producing adequate pressures. Indeed, for all practical purposes it is true to say that the two smaller holders, each capable of throwing 5½ in. W.G., have not been in useful operation during the past 20 years, although almost all that time they have

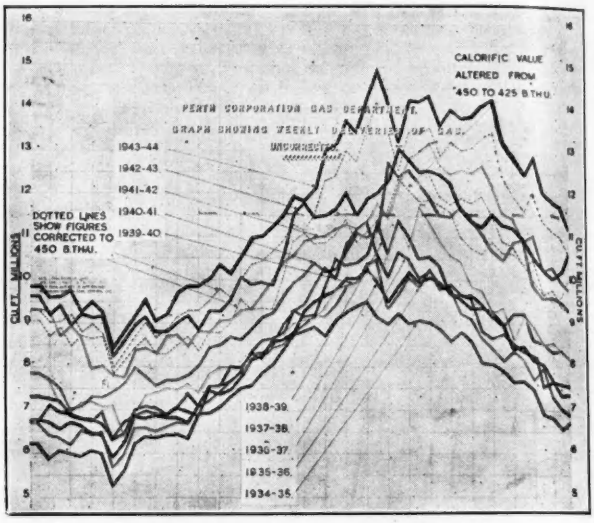


FIG. 3.—*Weekly Deliveries of Gas*, 1934-1944

remained full of gas, and have been maintained in excellent condition. The practice has been, and still continues to be, to confine the fluctuations of gas stock to the third holder. Latterly, however, it gradually became necessary to restrict stock fluctuations to the two lower lifts of the third, four-lift, spirally guided, 1¼ million holder. The four lifts of this holder are respectively capable of throwing pressures of 13¼ in., 11¼ in., 9¼ in. and 6¾ in. W.G.

The inadequacy of pressures available principally arises from the fact that the gas-works is over a mile from the fringe of the city proper, and some two miles from the centre of the main area of gas supply, while only one 20 in. diameter main extends from the gas-works towards the city, to a point known as the Shore Gasholder Station (Fig. 1), where the two smaller holders are situated. The third and largest holder is situated within the boundary of the gas-works itself. At the gasholder station a minimum of 7½ in. W.G. pressure is required at periods of peak demand, so that an even larger or additional pipe from the works to the holder station would not entirely solve the problem of making the best use of the existing total holder capacity.

(b) Supply Pressures of Principal Main

Between the gas-works and the holder station there is actually at present peak loads a pressure drop of 3½ in. W.G. on the 20 in. supply main. In addition, there was a further loss of pressure of 1 in. W.G.

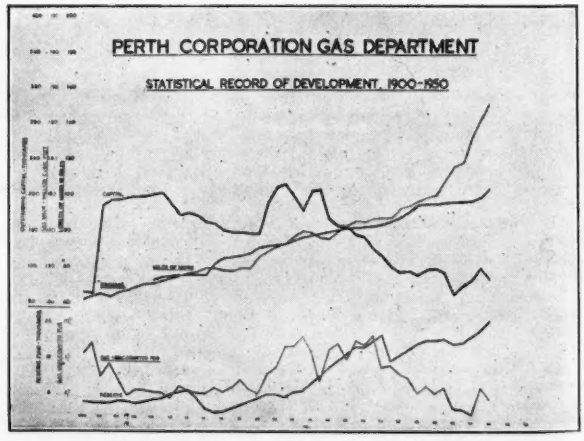


FIG. 4.—*Statistical Record of Development*

when the gas passed through the works station governor, while a still further drop in pressure is experienced between the gasholder station and the various parts of the city itself. The loss of pressure arising from the station governor has recently been recovered by means of a 24 in. diameter by-pass, the fitting of which was a part of the development scheme described in this Paper.

(c) General

The situation described became critical about three years ago, and as the conditions were likely to become increasingly aggravated by the ever-growing demand for gas, it was obviously necessary to take immediate steps to improve the distribution facilities as speedily and as economically as possible. This Paper is an endeavour to describe how a substantial improvement has been quite simply achieved, but in order to appreciate the *limae labor*, it seems desirable first of all to give, in some detail, an account of the various matters which were taken into consideration.

PEEBLES PATENT SELF-LOADING STATION GOVERNOR

All of the gas sent to the city was normally controlled by a station governor situated at the gas-works, and the performance of this particular governor cannot be too highly praised. The governor is as depicted in Fig. 5 (*a*), where it will be seen that the arrangement is really a combination of two governors, the first a differential pressure

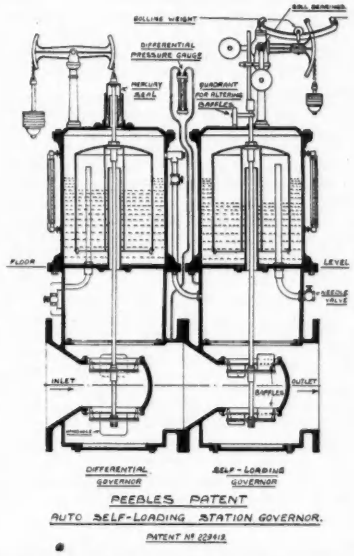


FIG. 5 (*a*).—*Peebles Self-loading Station Governor*

governor ensuring a constant pressure difference across the valves of the automatic unit. The second or main governor is the automatic loading unit. The governor is of standard design, including double-balanced valves, with the bell sealed off from the immediate outlet by a dip pipe. The outlet pressure is brought back under the bell by a control or impulse pipe from a little way along the outlet main where the gas is free from eddy currents.

Fixed to one end of the counter-balance arm is a curved rail, fashioned with a knife edge. The automatic action of the governor is obtained by a weighted carriage rolling on this knife edge. At the other end of the arm there is the usual balance weight required to counteract the moment produced by the weight of the bell and valve, which are attached to the arm by two rustless flexible steel tapes over an arc. This arrangement ensures that there is definitely no friction at the junction of the counter-balance arm and the valve rod when movement takes place. Once the counter-balancing effects are adjusted to suit the minimum pressure required, further loading is effected by the change in the moment of the rolling weight. When the demand for gas rises, the weighted carriage rolls inwards for increased pressure, and *vice versa*.

In this way the outlet pressure supply to the city was increased or decreased according to the demand for gas. Figs. 1 and 2, Appendix I, show a typical outlet pressure chart over 24 hr., and a corresponding chart taken over a mile away from the governor outlet. This latter chart, it will be seen, gives a fairly regular pressure throughout the 24 hr., and this could easily be maintained for days in succession without any manual assistance whatsoever, so long as the district

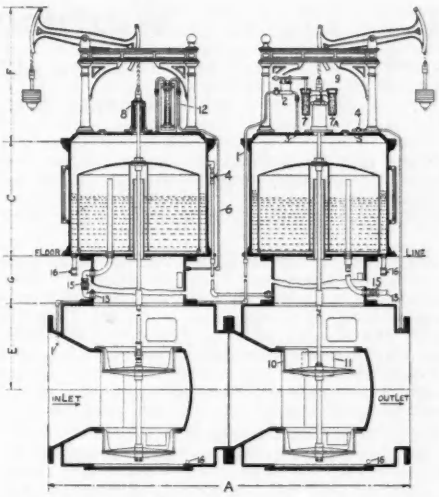


FIG. 5 (*b*).—*Peebles Self-loading Station Governor Adapted for Pressure Loading*

pipe network could adequately meet all demands placed upon it.

Unfortunately, however, with the increased throughput, the distant constant effect of the governor was gradually lost at the extremities of the supply system. The effect can still, however, be maintained during off-peak loads, and at a distance about half-way to the city, even at times of maximum demand. The reason for this, of course, is the inadequacy of the main pipe to the city, and the limitations of fluctuation in the outlet pressure of the self-loading governor, as originally designed.

Owing to the higher outlet pressures, the rolling weight became cumbersome and apt to be unstable, and occasionally overran its position, causing hunting. For this reason it was originally decided to alter the governor to *automatic pressure loading*, using the inlet gas pressure through a pilot governor. Pressure loading gives a larger range of outlet pressures with steadier action at the same time.

The new arrangement (Fig. 5 (*b*)) envisaged a pilot governor being loaded by the movement of a small rod attached to the valve rod of the main governor. The small rod dips into a cup of mercury carried on a lever which acts on the pilot governor valve rod, increasing or decreasing the loading by means of varying the buoyance of the mercury. The pressure from the pilot governor then loads the bell of the main governor as required, according to the demand for gas.

The station governor, with the modifications envisaged, would, it was hoped, continue to give an equally excellent account of itself during the lighter demand period of the summer months, when the alternative booster system now installed would not be required.

Obviously, however, the loading of the governor should ordinarily be pre-arranged to give a constant pressure at the furthest extremities of the pipe network. If the capacity of the pipe system is insufficient, then the pressures in the intermediate and communicating pipes will vary accordingly. Before this improvement could be effected a new peak demand load about 30% greater than ever previously experienced made it manifest that adequate supplies could only be maintained by low pressure boosting, unless additional trunk feeder mains were provided, and in consequence the scheme for conversion of the existing station governor to automatic pressure loading was abandoned.

(*To be continued*)

Renfrew County Council proposes to erect 126 houses at Linwood and asked the Paisley Gas Department to supply gas for cookers and wash boilers to each house. The total estimated cost for mains and services is £2,650, of which it is expected £650 will be recovered from the County Council. The Ministry of Fuel and Power has authorized the scheme and it is proposed to proceed with the work immediately.

Science and the Public Welfare is the theme of a conference organized by the North East Area Committee of the Association of Scientific Workers, to be held at the City Memorial Hall, Sheffield, on Nov. 16 and 17. The object is to give the people of the northern counties some insight into the part science is playing in the interests of their general welfare. Professor P. M. S. Blackett (Manchester University) and Professor J. D. Bernal (London University) will speak on the social implications of science; Dr. J. Rotblat, Director of Atomic Research at Liverpool University, will deal with the future use of atomic energy, and it is hoped that other speakers will include a representative of the Government, while several overseas scientists are also expected to take part.

Wartime Carbonization*

By ALEXANDER McFADYEN
Engineer and Manager, Gas-Works, Dumbarton

SHORTLY after the outbreak of hostilities in Septmber, 1939, it became apparent that, owing to the large number of industrial consumers engaged upon work of national importance located in Dumbarton, the demand for gas in the area of supply would increase rapidly.

The capacities of the carbonizing and ancillary plants were increased by 50% and 100% respectively during the years 1937 and 1938, and the undertaking was accordingly in 1939 in the fortunate position of having carbonizing plant capable of producing 1,440,000 cu.ft. of gas per day and all other plant capable of handling 2,000,000 cu.ft. of gas per day. The maximum daily output of gas had not previously exceeded 1,000,000 cu.ft., but it was estimated that the emergency could safely be overcome with the existing installation, provided the plant could be operated at full rated capacity when required.

The records of the undertaking show that the 1939-40 maximum day output was exceeded by 56% in January, 1945, and for ten consecutive days during that month the gas delivered to consumers each day exceeded the total rated carbonizing capacity by approximately 60,000 cu.ft. These outputs of 1,500,000 cu.ft. of gas per day were obtained by the use of only five-sixths of the total carbonizing capacity, and the remaining bed of four retorts was never actually under heat. Still higher outputs were required for a short period during January, 1946, and these also were obtained with one bed of four retorts completely off heat.

It would appear, therefore, that the plant rated at 1,440,000 cu.ft. per day might be capable of producing over 1,750,000 cu.ft. per day, but this has yet to be proved in practice.

It must not be assumed, however, that carbonizing methods were hurriedly altered to meet any emergency, the fact being that from the beginning of the war period a new carbonizing technique was gradually developed which has proved to be financially sound.

To obtain greater yields of gas per unit of plant one would expect that efficiency would be sacrificed to some extent, but that this did not prove to be the case will be seen from the following table of results:

	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	1944-45.	1945-46.
Gas made ... 1,000 cu.ft.	250,785	287,124	315,732	326,720	355,954	367,169	376,116
Coal carbonized ... Tons	13,436	14,544	16,599	16,493	17,771	18,328	18,414
Gas made per ton Cu.ft.	18,665	19,740	19,021	19,810	20,030	20,003	20,425
C.V. per Sigma recorder B.Th.U./cu.ft.	407.2	406.5	407.3	405.1	402.3	406.4	406.2
Gas made per ton Therms	76.0	80.24	77.47	80.25	80.58	81.41	82.90
Benzole made per ton ,,	—	—	—	—	1.45	0.86	—
Total therms per ton ...	76.0	80.24	77.47	80.25	82.03	82.27	82.96
Coke yield per ton Cwt.	10.21	10.12	10.88	11.10	11.03	11.08	11.11
Coke sold per ton... ,,	6.29	7.09	7.00	7.11	7.32	7.42	7.70
Tar yield per ton ... Gall.	21.39	20.17	20.14	20.24	18.01	18.61	19.80
Gas made per retort Cu.ft.	55,400	57,210	57,860	69,728	68,498	71,400	71,510

A brief analysis of these results shows that although the rated throughput of coal per retort has been exceeded by approximately 17%, the yield of gas and coke per ton of coal carbonized has not been decreased.

Percentage increase in gas made over seven years' period	53.70
Percentage increase in total coal carbonized	37.05
Percentage increase in coke made/ton coal carbonized	8.81
Percentage increase in coke made available for sale/ton coal carbonized	22.42
Percentage increase in gas made/retort	29.10
Percentage decrease in tar made/ton coal carbonized..	2.76

The financial benefits derived from this improved carbonizing efficiency are obvious, and, as it is not my intention to enter into the question of production costs, I should mention, however, that these are so far reduced that we have not found it necessary to increase the scale of charges to consumers since 1940; in fact, during the years 1943-44 and 1944-45 we were able to grant all consumers a special rebate of 1s. per thousand cu.ft. and 6d. per thousand cu.ft. respectively on all gas consumed during the winter quarters of these years. The average selling price of gas within the area for 1945-46 did not exceed 2s. 11d. per thousand cu.ft. on a scale ranging from 3s. 6d. to 2s. 3d. per thousand cu.ft. of gas sold.

Many advantages gained by increased production per unit of plant do not appear in the balance-sheet, but of these I would mention only two.

The first, and to my mind the more important, was the fact that we were able to operate the carbonizing plant with two-thirds of the staff which we required previously—a considerable advantage within an industrial area where labour was apparently of greater value to establishments outside the gas-works.

Secondly, we were fortunate to be able to retain one-sixth of the plant as spare when, under normal conditions, we should have expected to find ourselves in a very different position.

I propose now to describe the construction of the carbonizing plant and the methods of operation applied to obtain the foregoing results.

The carbonizing plant at Dumbarton consists of 24 Glover-West continuous vertical retorts each with a throughput of three tons of coal per day and a rated capacity of 60,000 cu.ft. of gas at a calorific value of 400-425 B.Th.U. per cu.ft. from standard Scottish coals.

The retorts are built in units of two and settings of four, in three benches of eight, heated by six producers feeding into a common gas flue.

Four producers are of standard size and were originally of the open suction type with step grates, but two of these are now fitted with doors and pressure equipment.

The remaining two producers, built in 1938, are of the open suction type with step grates, but are 30% over standard capacity.

In 1938 a Spencer-Bonecourt waste heat boiler complete with G. & B. turbine and Sirocco fan was incorporated in the system, otherwise the carbonizing plant is in its original state.

One of the original two benches of eight retorts was rebuilt in 1935 and the other in 1940. The latter bench has been under heat continually since rebuilding. The third bench, built in 1938, has also operated continually since that year. Benches Nos. 1 and 3 are now heated by the parallel system of heating. No 2 Bench is still operated by the old " return " method of heating.

Operation and Control of Producers

It has been said that the success or failure of an undertaking depends upon the results obtained in the retort house. This is very true, but I should like to suggest that the success or comparative failure of any retort house certainly depends entirely upon the efficient operation and performance of its producers. I cannot over-emphasize the importance I attach to the operation of producers. Unless producer gas of sufficient volume and suitable quality is continuously produced over the 24-hour period, the retort house operator cannot expect to achieve the desired efficiency in carbonization. It is regrettable that a decrease in volume of producer gas is usually accompanied by a drop in its calorific value, and both, unless quickly noted, soon cause a considerable drop in temperature in the heating flues. If these conditions are allowed to continue for even a very short period the thermal yield per retort automatically decreases, the heating system remains under " pull " conditions, and dust is drawn from the producers to the CO nostrils and combustion flues. At this stage a continuous depreciation of conditions within the producers is suffered which itself further aggravates conditions within the retort-setting.

This state of affairs is most commonly experienced when the producers are under maximum load and usually at peak winter periods when a drop in thermal yield from the retorts cannot be permitted. Consequently, carbonizing efficiency is sacrificed to obtain the required yield of gas per retort.

If such conditions are allowed to prevail during intervals throughout the winter period the maintenance of gas output is often in danger, the average efficiency of production is lowered, and the after-effects of clinker formation and removal increase rapidly the cost of producer maintenance, and also reduce the efficiency of heat transferred to the retorts due to dust and clinker forming in inaccessible corners of the combustion flues. Overheating of the CO flues is also a common source of trouble.

*Paper to the North British Association of Gas Managers, Sept. 12, 1946

In an effort to obviate these troubles as far as possible, especially during the winter period, when the qualities of coal which we were required to carbonize did not always provide the best type of producer fuel, we embarked upon a series of experiments designed to improve the performance of the producers.

There is no theoretical difficulty in making satisfactory fuel gas by the action of air on carbon. In practice, however, the matter is not so simple. Coke is not pure carbon, and the fact that its ash is partially fusible at temperatures prevailing in producer practice limits the conditions under which a producer may be worked.

The proportion of carbon monoxide in the producer gas, which determines its combustion properties, depends mainly on two factors:

(1) The temperature of the fuel bed.

(2) The depth of the fuel bed which determines the time contact between fuel and air.

The CO/CO_2 ratio increases with increase of temperature, and a deep fuel bed has a similar effect. Too great a depth of fuel, however, is liable to reduce the working temperature owing to the thermal capacity of such a large mass of fuel.

Increased Throughput

When we decided to attempt to increase the coal throughput of the retorts we realized that the gradient of the heat passing from the combustion chambers through the retort wall to the charge would require to be increased. This was effected by maintaining the quality of the producer gas and increasing the volume. To increase the volume of gas made in the producers was obviously running the risk of greater formation of clinker due to overheating. To overcome this a common producer gas main was built to feed all three benches of retorts, and where previously breeze had been burned in two of the six producers, it was decided to operate the complete battery of producers on unscreened coke drawn direct from the retorts. In order to keep correct records of the performance of each and all producers an electrically operated skip weighing machine was installed. Coke is fed directly from an overhead bunker to the charging skip, which is automatically weighed before being pushed from the balance beam on to the runway above the producer charging lids. The total weight of coke charged to the producers is recorded on a dial and checked each morning. There is also an arrangement whereby the coke charged to individual producers may be checked. Tickets numbered according to the number of each producer are issued to the leading stoker, and as the producer is charged the amount of coke is recorded, in cwts. and quarters, upon the ticket. This procedure is not followed daily but is done periodically, when it is suspected that one or more producers are providing less than their share of gas to the common flue.

When the common flue was brought into operation considerable difficulty was at first experienced due to lack of pressure accompanied by air leaks resulting in overheating in certain portions of the flue. Regular cleaning and pointing of the flue brickwork was instituted. Apart from the fact that overheating was dangerous to the structure of the flue the loss of CO was considerable, due to its premature combustion. The flue was maintained under these far from satisfactory conditions until all leakage of air was stopped, and then it was decided that the pressure in the flue must, at all costs, be increased. While four settings of retorts were under heat by four producers an extra producer was lit and admitted to the system. When this was done an excess volume of producer gas was present in the common flue, and consequently the coke used per ton of coal carbonized was increased. Under the prevailing conditions it was realized that the amount of gas made per producer might be reduced to provide the required pressure in the common flue, and possibly result in an improvement in producer gas quality.

Balance between Producers

Having producers of different capacities and under different methods of control, it was first decided to attempt to feed to each producer a reasonably correct percentage of the total coke used. This was done by controlling the amount of air admitted and water evaporated in the open grate type and by adjustment of the air-steam ratio on the closed producers. By checking the weight of coke consumed a reasonable balance was achieved between the different producers. Next the ash banking of each producer was altered, in order that the volume of air admitted could be decreased and the amount required could be admitted as near the bottom of the grate as possible in an effort to reduce coke consumption, increase the temperature and depth of fuel bed and ultimately reduce the volume of gas produced. When improvement was noticed we decided to reduce the clinkering periods from twice to once daily. Pressure and temperature recorders were fitted to the pressure producers, and a pressure recorder was also fitted to the common flue.

After continuous testing of producer gas, which produced results which could at times be considered almost theoretical and at other times the reverse, we eventually achieved comparatively settled conditions.

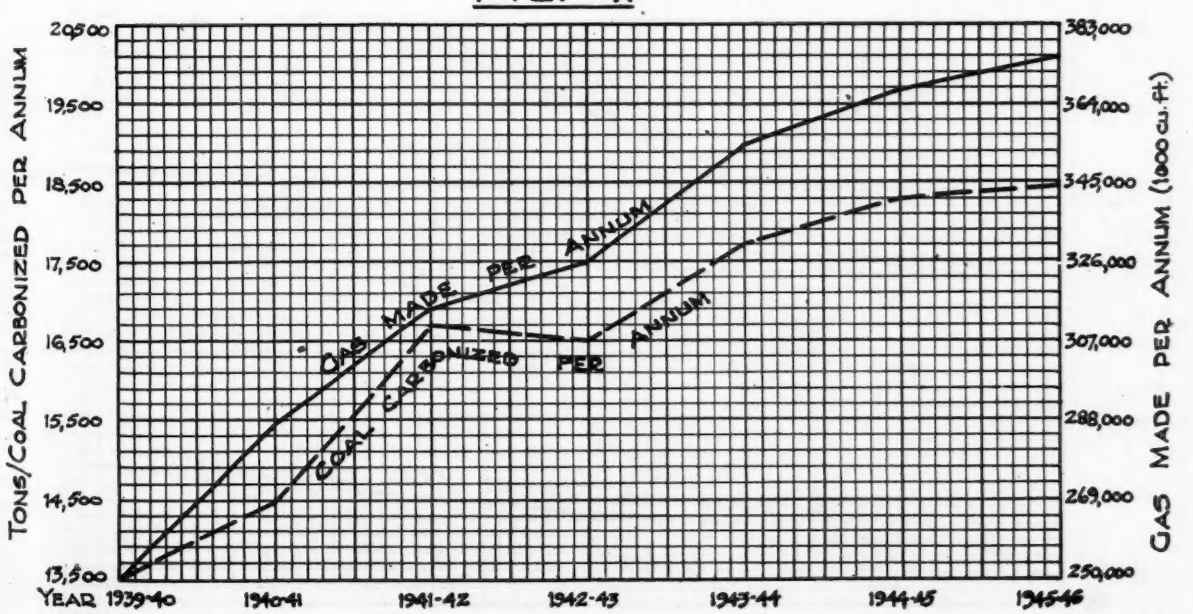
The amount of steam admitted to the pressure producers was fixed at one notch at 75 lb. pressure on the West-Taylor valve, and the temperature of the air-steam mixture was never allowed beyond the limits of 115°-120° F. Regular cleaning of the venturi tubes to the pressure producers ensures the correct air/steam mixture, and maintenance of a regular supply of water to the steps is also necessary to ensure constant conditions in the fuel bed. The pressure below the grate of these producers was .05 in W.G. and the pressure in the common flue was seldom below 0.3 in. W.G. If the producers were left open for too long a period while being clinkered, and if no make-up was provided for at the time, the pressure was inclined to fall in the flue.

It was never the practice to increase the rate of gasification of remaining producers while one was being cleaned. It was better strictly to limit the cleaning time. For the past few years we have avoided " pricking up " of producers, and cleaning is only allowed once daily.

The quality of producer gas obtained under these conditions was not as low in CO_2 content as is prescribed theoretically, but it was found an advantage to allow up to 7% CO_2 in order to restrict the temperature of the fuel bed and successfully avoid clinker formation. Given reasonably good quality gas of ample volume and pressure I am quite sure little trouble should be found in heating a retort setting.

The success of this method of operating producers has convinced me in practice that it is beneficial to admit an extra producer to the

FIG. 1.



common flue. There is nothing more desirable than to have a battery of producers providing an ample quantity of gas which can be drawn upon at will.

As is the case in most undertakings, it is very difficult to achieve a favourable figure for coke used per ton of coal carbonized, owing to the fact that the retorts are heated in beds of four or more at a time, when for long periods only one retort in the extra bed is required.

Our average yearly coke consumption is usually about 14% on weight of coal carbonized, with figures such as 10% over considerable periods in mid-winter with five beds of retorts operating to capacity and being supplied by six producers. I do not, however, wish to dwell upon this aspect of fuel consumption, as all my calculations for fuel consumption are based upon coke used per therm of gas produced.

If 1,000,000 cu.ft. of gas at 400 C.V. is produced at 20,000 cu.ft. per ton of coal, then 50 tons of coal are carbonized. Let us suppose that 6 tons of coke are used in the producer. Then the coke consumed amounts to 12 lb. per 100 lb. of coal carbonized. On the other hand, if the same amount of coke is used in the producers and the gas evolved is inefficiently consumed in the combustion chambers, the result might be that 60 tons of coal are required to produce 1,000,000 cu.ft. of coal gas. We then say that the coke used in producers amounts to 10 lb. per 100 lb. of coal carbonized, but it does not follow that a higher yield of coke per ton of coal will result because of a lower make of gas per ton of coal.

Combustion of Producer Gas in Setting

Assuming that sufficient volume of producer gas is available in the common flue, and the retort bench brickwork is reasonably well maintained, combustion within the retort setting should be fairly simple. Attention must be paid particularly to pressure conditions in the CO uptakes. If they are not operated under pressure at the top to, at least, level gauge at the bottom conditions will never be satisfactory, especially if the control of " pull " is not fairly steady.

In Dumbarton these conditions are steadily maintained by the waste heat boiler fan, and we attempt to maintain adequate pressures throughout the setting.

The heating system consists of five combustion chambers and four circulating chambers on each side of the retort beds, but after experiment we found that we were able to block up the top CO nostril and operate successfully with four live and five circulating chambers.

Secondary air is admitted from the non-producer side of the setting, and is led in a duct to the opposite side and admitted above the CO nostril to effect combustion. In practice we find that when the heats go off it is seldom due to CO trouble, but nearly always due to the secondary air ducts becoming choked at the point where the air duct changes direction to enter above the CO nostril. This is now overcome by periodically admitting a short air blast at 300 lb. pressure, which effectively removes the obstruction. All CO nostrils are cleaned reguarly and combustion flues are cleaned monthly. Dust is removed daily from the CO main dampers and chimney dampers. CO nostrils are interchangeable, and we attempt to maintain heats which allow the largest possible throughput of coal per retort to be efficiently carbonized, with the maximum percentage water gas production within the retorts and with a final C.V. of 400.

To maintain high carbonizing temperatures it is necessary to take temperature readings daily to avoid overheating and to ensure correct heat zoning. If overheating is found, it is usually due to the rate of carbonization being altered or steaming being checked. We avoid frequent alterations to individual control dampers.

Mixing of Coals

Under war-time conditions the uniform mixing of coals has really become almost impossible, but as far as possible we attempt to maintain a steady mixture of coals. For the past few years we have been able to operate a mixture of approximately two wagons of non-coking coal to one wagon of coking coal. Under the present scheme of demurrage charges we find it possible to carry up to two days' supply of coal in wagons. Except during peak periods we often await the arrival of the daily coal train to enable us to maintain our normal mixture. If coals are allocated to the undertaking in the ratio of 300 tons non-coking to 150 tons coking coals per week we are fairly certain to expect deliveries in that ratio, and every effort is made to carbonize the allocation of coal in this manner.

The best results have been obtained when using a mixture of non-coking treble nuts and coking double nuts in the ratio of two to one.

When Durham coal of any description is directed to us, we never allow this to be mixed with the Scottish coals. A section of the plant is devoted to the Durham coal, and the coke produced is not mixed in the producer with our normal coke owing to the difference in their physical structures and ash fusion points. These differences are a source of trouble in the best controlled producers.

All coal elevated to bunkers is carefully weighed and empty wagons tared. Overhead bunkers are levelled each morning at 8 a.m., and an accurate measurement is obtained as to the amount of coal carbonized during the previous twenty-four hours. Coal used from stock is also weighed.

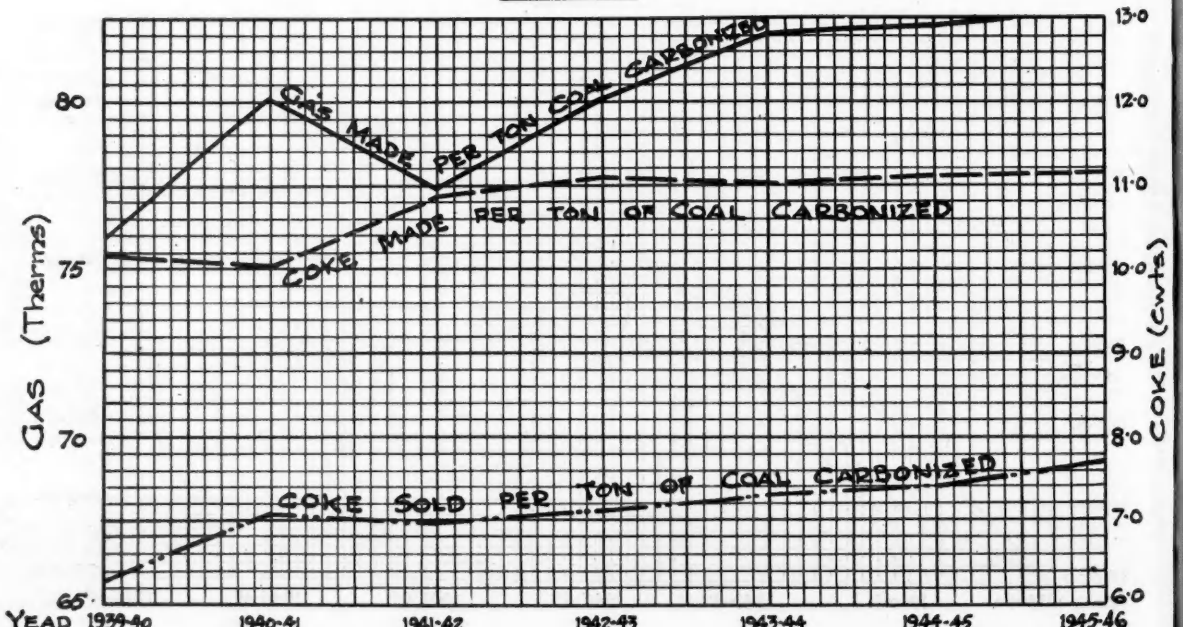
Operation of Retorts: Effect of Pressure Conditions

The proper control of pressure conditions within the retorts is a matter of prime importance in preserving the life of the retorts and obtaining the maximum yield of products of the required quality.

In general, trouble connected with pressures may be divided into two categories—positive pressure and negative pressure (or pull). Relatively excessive pressure leads to gas leakage outwards to the flues surrounding the retorts and to loss of hydrocarbons. It may also result in local hot spots in the flues. Greater damage is usually done when leakage outwards is at the bottom of the retorts where no scurf formation exists, and where there is more possibility of the leaking coal gas finding sufficient air in the flues with which to burn, as the air at this stage has not completely consumed all the producer gas present.

Retorts under pull conditions can never be expected to produce gas efficiently, as leakage of flue gas inwards is always possible, resulting in lowering of C.V. of the gas. When there is leaking iron-work bad cases of overpulling may result in loss of gas by combustion in the indrawn air. When leakage is present in bottom mouthpiece iron-work, combustion of some of the coke, coal and gas certainly reduces efficiency and lowers C.V. due to the addition of atmospheric nitrogen.

FIG. 2.



In such cases there will also be trouble with pitching-up of offtake pipes due to distillation, cracking and combustion of tar vapours. In this connexion I may say that we never require to flush our collecting mains or foul mains with liquor. Indeed, there is no provision for doing so.

The lowering of the C.V. of the gas by the addition of inerts is bad practice, since it leads to a restriction of the amount of steam which can be converted when working to produce gas of a predetermined calorific value; in other words, it limits the amount of coke which can be gasified, and lowers the amount of gas which can be made per ton of coal.

Let us suppose it is required to produce gas at 400 B.Th.U. per cu.ft., and the gas being produced has a C.V. of 450 B.Th.U. per cu.ft. There are two ways in which the necessary lowering of C.V. can be done. One method is by the addition of inerts, and the other is by the addition of blue water gas at 290 C.V. made by increased steaming of the charge in the retorts. Suppose an original make per ton of 450 gas is qual to 15,300 cu.ft. To bring this down by the addition of inerts will not affect the quantity of therms per ton, but will increase the gas volume to 17,212. If, however, the C.V. is reduced to 400 by addition of blue water gas to 290 C.V., there is not only an increase in volume but also an increase in therms per ton of coal. If " B " is the amount of water gas which has to be added per ton of coal, then the volume of 400 gas will be 15,300 plus " B." B.Th.U. per ton will then equal $400 \times (15{,}300 + B)$. But B.Th.U. per ton is also equal to $(15{,}300 \times 450) + (290 \times B)$.

$\therefore 400\ (15{,}300 + B) = (6{,}885{,}000 + 290\ B)$

$\therefore B = 6{,}955$ cu.ft.

The new volume of 400 C.V. gas would be 22,255 cu.ft. and the increased thermal yield would be equal to

$6{,}955 \times 290 = 20.17$ therms, giving a new total of 89.02 therms.

This of course does not represent entirely an additional yield of therms per ton of coal but per ton of coal plus coke. Therefore every additional therm is not an actual gain, but as a therm of gas is worth more financially than a therm of coke, it is advisable to proceed on these lines.

By increasing the yield of gas from our own plant, and consequently increasing the throughput of coal, a greater volume of steam was required to maintain, or possible increase, the previous steaming percentage. This was provided by the waste heat boiler and fed through a reducing valve set to blow off at 28 lb. per sq. in. pressure. The steam main to the retorts is of ample size, and steam is fed into this at three points along the bench to ensure equal pressure conditions at the inlet to each mouthpiece. This is checked on three steam gauges disposed equally over the range. All steam to retorts is measured by a meter enabling a complete check at all times. The West-Taylor valves and steam pipes to the coke chambers are cleaned at regular intervals.

Test Results

During the whole of the calendar month of November, 1945, a test was run to observe the results obtained under good working conditions.

The average results were as follows:

Throughput of coal, per retort per day ..	3.5 tons
Yield of gas per ton of coal	21,125 cu.ft.
Yield of gas per retort	73,837 cu.ft.
Average C.V. of gas (tested by Board of Trade Examiner)	402 B.Th.U.
Steam admitted to each retort per hour ..	70 lb.
Steam on weight of coal carbonized (approximate)	22%

During the test steam was admitted continuously at 28 lb. per sq. in. with an opening of seven notches on the West-Taylor valves, and this was checked against the steam meter reading. The amount of coke produced equalled 11.2 cwt. per ton, and the coke used in the producers amounted to 12.6 lb. per 100 lb. of coal carbonized. To maintain the above thermal yields it was necessary to keep the heats on the bench under very close observation, and although, in practice, it is realized that the results obtained were reasonably efficient, it must be admitted that theoretically much better yields should have been obtained. We did not find that the coke used in producers had increased above the normal percentage used at that time of the year, which was probably due to the fact that if high temperatures are maintained, there should be sufficient heat stored in the coke within the retort to supply that absorbed in the water gas reaction. It has been proved elsewhere that no appreciable increase in heat supplied to the retort by producer gas combustion is necessary up to 20% steaming.

At the rate of steaming attempted during the test we found difficulty in keeping the inert content of the gas below 13.2% at 402 C.V. This suggests that excess CO_2 was present, showing that too much undecomposed steam had gone forward.

Although no apparent drop in carbonizing temperatures was noticed, the high CO_2 content may have been due to the fact that the temperature gradient through the retort walls was higher than usual. The zoning of heat in the retorts was arranged to give the highest temperature exactly in the middle of the retort, and the temperatures from that point upwards and downwards were gradually reduced. The very considerable difference in gas yields between high and low temperature practice is mainly due to the decomposition of these primary products which, in low temperature carbonization, go forward into the tar as liquids. On the other hand, if carbonizing temperatures are too high, the gas quality becomes degraded and the thermal yield of the gas lessened by the decomposition of these hydrocarbons, which split off hydrogen, or form simpler compounds, with the formation of free carbon. It has been found that an increased throughput of coal will not provide increased thermal yields beyond a certain limit, after which a sharp fall in yield is suffered. The reason for such an increase appears to be that the gas evolved at the lower end of the carbonizing " V " requires a certain length of travel in order that it may become sufficiently cracked. An increase in coal throughput will bring the apex of the carbonizing " V " lower down the retort and ensure a longer time contact in which to crack the gas and vapours. Too great an increase, however, will bring the " V" too low in the retort, with the result that over-cracking may take place; uncarbonized coal may be present in the coke, and the heat gradient through the wall of the retort will become too great.

In general, practical control of the retort bench is the most important factor upon which the efficiency of carbonization depends. It is very desirable to spend considerable sums of money on the purchase of the instruments and recorders necessary to provide a check upon the chemical and technical control of the system. But, to my mind, it is first essential to have all instruments and automatic control devices maintained in good working order. It is then necessary to follow up the observations made by effective action to remedy the deficiencies revealed. This can only be done by energetic application of the technical and practical knowledge essential to the modern retort house operator.

Even when a particularly efficient system of carbonization is installed, continued success is dependent upon the maintenance of every section of plant within the gas-works.

Waste Heat Boiler

During the winter of 1943 the waste heat boiler was out of commission due to circumstances outside our control, and it was decided that a test should be made to determine the loss in efficiency due to this. Exhaust steam from all steam-driven machinery is collected and passed to an oil separator and then to a boiler feed-water heater common to all boilers. The water, before being preheated by the exhaust steam, is first passed through the gas cooling condensers and run to a lagged underground tank adjacent to the boiler feed pumps. When the waste heat boiler was in operation breeze from $\frac{3}{8}$ in. to 0 in. was alone used in the solid fired boilers, but during the period of test high-grade fuel was essential to provide the required amount of steam for all purposes.

Production costs, of course, rapidly increased beyond the ratio of the inevitable decrease in thermal efficiency of production, due to the fact that the C.V. of breeze is usually accepted to be the same as coke. Even allowing for this the decrease in thermal efficiency without the use of the waste heat boiler amounted to 7.2%.

The fact that we lost the use of the boiler during the vital winter months of that year enabled us to assess in a practical way the contribution made by the waste heat boiler to the thermal efficiency of the plant.

When the boiler was put into commission again several tests were made to obtain the efficiency of its performance.

Air infiltration was reduced to lowest possible level, and it was found that the boiler was capable of producing considerably more steam than that for which it is rated. To do so, of course, the tubes require to be kept well cleaned inside and outside to avoid reduction in heat transferred to the water and consequently damage to the boiler itself. One quarter of the tubes are cleaned daily, giving steady outlet temperature of waste gases.

Exhausters

In 1943 our existing two-blade exhausters were scrapped and replaced by two 100,000 cu.ft. per hour Rootes type exhausters. Due to the higher running speeds of these engines much better control of pressure within the retorts was possible. The lack of pulsation was especially noted, and as a result of this the C.V. of the gas produced was considerably increased, and this allowed us to operate increased steaming within the retorts, giving improved thermal yields. A continuous record of the rate of pull by the exhausters shows that this can be easily maintained with a variation within such limits as .05 in. W.G. To permanently maintain such conditions it is essential to keep all gas-ways cleaned, particularly at the retort house governor. Two years ago a pipe was laid from the common exhaust steam main with $\frac{1}{2}$ in. connexions to each end of the foul main, the cleaning door of the retort house governor and the outlet bend of the same where this goes outside the building to the atmosphere and to a point in the tar main below the retort house seal pot. This has proved eminently successful in keeping down obstructions. No flushing is done in the collecting mains, and all valves and pipes are clean to the metal.

Connersville Meter

In 1944 the old wet station meter was replaced by a Holmes Connersville meter fitted with a Harding's tachograph. The tachograph has become one of the most important instruments within the works.

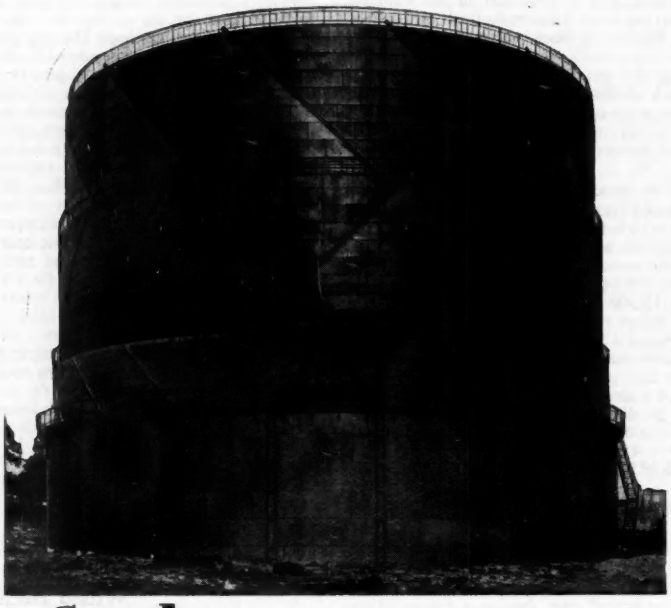
GASHOLDERS

•

PURIFIERS

•

CONDENSERS



RETORT HOUSE EQUIPMENT

•

STEEL TANKS for OIL STORAGE and GASHOLDER PURPOSES

•

COAL & COKE HANDLING PLANTS

WESTMINSTER
39, Victoria Street,
S.W.1.

Telephone: Abbey 3121.

Telegrams:
Retortus, Sowest, London.

Sam!
CUTLER
& Sons Ltd.

MILLWALL
Providence Iron
Works, E.14.

Telephone: East 5231-2.

Telegrams:
Cutler, Millwall, London.

GAStrology

The thought for tomorrow, brought to you today by our Fearless Forecaster.—HORACE COPE.

MAY 21 — JUNE 21. GEMINI — THE TWINS

This is a moment of destiny for those born under the sign of Gemini. The conjunction of Venus with Jupiter means trouble for somebody if it's only Jupiter. You Gemini people will find next Thursday favourable for taking a long journey, but if you weren't thinking of taking a long journey, don't bother. Go to the pictures instead. The position of Mars on Friday morning will cause jitters on the Stock Exchange, but it doesn't need much to give them jitters, does it? Gemini people are particularly warned against being over-optimistic next week, though why anybody should want to be over-optimistic these days has us beaten.

For a really sound word of advice on future events however, let 'A & M' Meters form a buffer against the troublesome factors which are always liable to beset both gas supplier and gas consumer.

'A&M' Gas Meters

ALDER & MACKAY LTD.
NEW GRANGE WORKS
EDINBURGH, I.

When the dial which records the make per hour of gas shows a fall in production, an immediate warning is given to the technical assistant in charge of production. If the signal is answered, the cause of reduced production can usually be attributed to the stokers having left hanging retorts beyond the recognized rodding times and, as this deficiency is also to be recorded on the chart, there is little difficulty in proving after a short time the stokers who are not carrying out their duties in a proper manner. The old dodge of the leading man of the shift stealing good makes of gas from the meter is no longer possible.

Sigma Recorder

In Dumbarton, gas consumers are safeguarded by the Gas Regulation Acts of 1920 and 1929 in so far that a continuous record of gas quality is made on the chart of a sealed Sigma recorder. The regulations, in effect, ensure that the consumers receive gas at a calorific value which, over a period of three months, must not average less than that declared by the undertaking. This regulation is enforced under the penalty of a fine and the repayment of money to consumers if the calorific value of the gas does not equal within the prescribed limits that upon which the charges are based.

To maintain an average C.V. means that low calorific values must be balanced by higher values. In an undertaking not governed by these rules a fall in calorific value need not be later balanced by a proportionately higher calorific value. Over a period of a year this may amount to a considerable saving. When carbonizing results are quoted, calorific value is the one factor which is often in doubt unless this continuous check is imposed.

Conclusion

Our experience during the recent war period has impressed upon us the need for more efficient utilization of our fuel resources. I have endeavoured to show how this may be accomplished by improved carbonizing methods and rigid practical and scientific control within the retort house. If the foregoing pages have stimulated thought towards improvement in thermal or economic yield, I shall feel I have justified the confidence this Association has so generously placed in me.

DISCUSSION

The **President** (Mr. T. S. Lockhart) said Dumbarton had a model works and was in good hands despite the fact that Mr. McFadyen was one of their youngest engineers. He had had a heavy year. He had been President of the Scottish Junior Gas Association and, in addition, had agreed to give this Paper.

Mr. **A. Jamieson** (Johnstone) offered sincere congratulations to Mr. McFadyen on his Paper. When he (the speaker) gave his Presidential Address the previous year he had said there was no fear of the Industry in the future so long as the young men were coming forward and in Mr. McFadyen they had one of these young men who paid attention to their work. If they visited his works they would find that efficiency went hand in hand with cleanliness and maintenance. The works at Dumbarton were second to none in the country. He was glad that Mr. McFadyen had put such emphasis on the question of producers. This was something to which the makers of plant had paid too little attention. The producers they had to-day were the same as those of 20 years ago. Surely improvements had been possible in that time! Sir Charles MacAndrew, M.P., was with them and he would learn from the Paper that carbonization of coal was the only proper method of using it. Coal was the most valuable thing in Britain to-day and it should not be wasted. Sir Charles should go back to Westminster with the feeling that if coal was to be mined in Britain it should be used first of all by the Gas Industry. Regarding exhausters, he had seen them in operation at Dumbarton and had then recommended their installation at Johnstone; a step which he had never regretted.

Mr. **H. S. Milne** (Aberdeen) said that a Paper on retort house practice was always interesting and they had listened that day to one of outstanding interest. Mr. McFadyen had shown what he and his predecessors had done by careful attention to details. None of the points mentioned in the Paper, taken singly, would have led to the results obtained, but, taken all together, they had seen how appreciable their effect had been. Most of them were inclined to pay undue attention to some single part of their works. They all had their own pet ideas and were inclined to take the carbonizing plant for granted. The Paper should make them think seriously of what could be done by taking thought. He would like to know how the quality and supply of coal to Dumbarton compared with pre-war conditions. Mr. McFadyen was fortunate in getting supplies in such a way as to allow of him blending his coal as he wanted. He had also been able to use Durham coal without mixing with Scottish coal. What was his experience in carbonizing 100% Durham coal? Had he any difficulty in controlling the calorific value under certain conditions?

Mr. **James Bell** (formerly of Dumbarton) said the original plant had been reconditioned in the last ten years. The Paper would be valuable to engineers operating similar plant in works large or small. Better efficiency figures could be obtained in larger units but parts of the plant were older than others. The Paper recalled to him the progress of the undertaking. The results were shown in the selling price of gas. In 1938 the average price in Dumbarton on the sliding scale principle was 2s. 4.8d. and last year it was only 2s. 11d. per 1,000 cu.ft. The small increase of 6½d. during the war years spoke for itself and showed the effect of higher efficiency. Producer clinkering was an arduous job and Mr. McFadyen had reduced the labour involved in this, a valuable consideration. There was a plant operated on the draught principle by mechanical means and thus they were able to maintain perfect and constant conditions of heat.

Referring to the fact that the Dumbarton works had been bombed during the war, Mr. Bell said they were able nevertheless to maintain a supply of gas and that was the main thing. Mr. McFadyen had dealt with producer gas flow. This made possible the achievement of the important results shown in the Paper. By delivering producer gas in a common chamber it allowed any one producer to be let down for an indefinite period for clinkering or relining. Two years ago two producers were relined while the retort above them went on producing gas without interruption.

Mr. McFadyen had reached a high achievement in economic production. The last extension was in 1938 and since then production had never ceased, the eight retorts having carbonized 64,000 tons of coal in that time. He had seen them a few weeks ago and they looked as good as the day they were bought, a tribute to the stability of the plant, which was hard worked during the war. Mr. McFadyen's value to the Association would be appreciated as time went on. In Dumbarton he was the right man in the right place. He congratulated him on his first appearance on the platform of the Association.

Mr. **Robert Sturrock** (Ardrossan) said he had known Mr. McFadyen from his early days in the Industry and they would hear more about him. In the West of Scotland they knew the kind of coal they had been receiving and he was interested to note the figures for coke yield. He would like to know how the increased yield came about. The yield of tar had also increased and that was unusual. Mr. McFadyen had been favourably placed in being able to make use of coke breeze when he needed it to carry on the work and give him the steam required. His test results showed 402 B.Th.U. per cu.ft. How did that compare with the average result of the working of the plant during the year?

Mr. **D. Fulton** (Helensburgh) said a book, little read to-day, enjoined people to love their neighbours as themselves. But his words of praise were not conventional but were merited. He had a feeling of envy that in Helensburgh, only eight miles from Dumbarton, similar plant could not get near the Dumbarton results. With all their hard work they wondered why. "As the old cock crows the young one learns" was a well-known saying, but Mr. McFadyen, a chicken in the Industry, was able to tell him, one of the seniors, what he should do. His story had been told in a concise and admirable way and it would be better if more writers would understand that if one said a thing simply and lucidly it conveyed the message better than a multitude of words.

Producer Practice

Good work in the producer meant good work everywhere because a good heart meant a sound body. No other point in the Paper was of such importance as this—get your producers right and the rest would be right. The higher the temperature, the higher the heat of the coal, the better would be the gas yield and the coke results *pro rata* to the amount of coal carbonized. Due to this Mr. McFadyen had had excellent coke sale results, not very usual in continuous vertical retort practice in Scotland.

Mr. Fulton said that on many occasions he had spoken about producer practice and producer construction. It had always seemed to him in his 40 years' experience that the manufacture of producers had shown very little development in the small works but there had been some developments with mechanical producers in large works. He could not understand why they were still "thirled" to the practice of the producer being integral with the retort plant and yet being independent. If they had producers independent of the retort set and of a different shape they would have better results. They should adopt circular producers independent of the retort plant and so get better and more economic results. They wanted Mr. McFadyen to know that they considered he was doing his job most efficiently.

Mr. **E. G. Smith** (Dunfermline) said the Paper was what he expected from Mr. McFadyen. He had had the advantage of having Mr. McFadyen as his assistant at Dumbarton. When Mr. McFadyen and he worked under Mr. Bell the latter advised them to start with the producers; if there was nothing wrong with the plant they were not to blame the coal and if there was anything wrong with the plant they were not to blame the manufacturer. If everybody followed that line they would achieve some of the success which Mr. McFadyen had gained. The essence of the Paper was the emphasis laid on commonsense in the gas-works. The results quoted were not laboratory results over a short period but average results over a period of years. To be true, results should be continuously recorded. He hoped that Mr. McFadyen would record in their transactions at some future date what he had done also in the field of distribution.

Mr. **Ronald Glover** expressed his pleasure at being present and said that everyone who read Mr. McFadyen's Paper with care would produce results which would benefit the Industry.

GAS PRODUCTS PRICES

The London Market

September 27.

The market in all Coal Tar products continues very strong.

There are no changes to report in home prices, most of which are controlled by Government Orders.

Ball and *Flake Naphthalene* prices are from £26 15s. per ton delivered in 2 cwt. single bags and in 4 ton lots, with a range of prices covering smaller quantities and other forms of packing.

Briquetting Pitch for the home market is 75s. per ton in bulk ex makers' works.

Road Tar costs 5¾d. per gallon filled into buyers' road or rail tanks at sellers' works or 5⅞d. filled into buyers' barrels.

Creosote for timber preservation is 5½d. per gall. in bulk at makers' works, with extra charges allowed for small quantities, &c., as set out in the Coal Tar Products Prices Order.

Cresylic Acid prices vary from 3s. 6d. to 5s. per gall. according to grade. These prices are for material taken ex sellers' works.

The basic prices for *Coal Tar Naphtha* range from 1s. 11d. to 2s. 11d. per gall., according to grade, delivered in 1,000 gall. lots in bulk; similarly *Xylol* prices range from 3s. 3½d. to 3s. 6d. per gall.

All the foregoing prices refer to the home market.

The Provinces

October 1.

Average prices of gas-works products: Pitch, 75s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6⅝d. per gallon; pure, 3s. 2¼d. Prices for carbolic acid 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil are controlled by Government Orders. Prices for road tar were increased by a half-penny per gallon by S. R. & O. 1945, 229, under which Order there was also an increase of 5s. per ton in the price for standard creosote-pitch mixture.

Scotland

September 28.

Production would appear to be increasing.

*Refined Tar.** Yield to the Distiller is 5d. per gall. ex works, naked. *Creosote Oil.* Timber preserving quality,* 5½d. to 6½d. per gall.; Hydrogenation Oil,* 5⅝d. per gall.; Low Gravity or Virgin Oil,† 7¼d. to 7½d. per gall. ; Benzol Absorbing Oil, 6½d. to 8d. per gall. *Refined Cresylic Acid** is 3s. 6d. to 4s. 6d. per gall. ex works, naked, according to quality. *Crude Naphtha,*† 7d. to 8d. per gall. *Solvent Naphtha.** Basic maximum prices delivered in bulk, 90/160 grade, 2s. 10d. per gall, and 90/190 Heavy Naphtha, Unrectified, 2s. 0½d. per gall.; Rectified, 2s. 4d. per gall. *Pyridine,*† 90/160 grade, 15s. per gall., and 90/140 grade, 17s. per gall.

* Price controlled. † Uncontrolled.

TRADE CARDS

SIDNEY FLAVEL & CO. LTD.
Eagle Foundry, Leamington.
Ironfounders and Engineers.
STOVEMAKERS SINCE 1777.

FULL particulars of these spaces can be obtained on application to the Publishers. They are designed principally for the use of the firms whose display advertisements cannot be included owing to paper rationing.

WEST'S GAS IMPROVEMENT CO. LTD.
Miles Platting, Manchester 10. T/N Collyhurst 2961 (5 lines). T/A Stoker, Manchester. London Office: Columbia House, Aldwych, W.C.2. T/N Holborn 4108-9. T/A Wesgasco Estrand.
WEST'S CARBONIZING PLANTS.
GLOVER-WEST VERTICALS. WESTVERTICAL CHAMBERS.

HILMOR LTD.
Tube Bending Machines (Hand and Power). Tube Bending Specialists.
65, Calshot Street, King's Cross, London, N. 1. 'Phone: Terminus 4714 (2 lines).
We can supply machines for bending Gas and Steam Piping from ¾ in. to 2 in. in the cold state.

THOMAS GLOVER & CO., LTD.
Edmonton, London, N. 18, and Branches. Established in 1844.
. . . . FOR RELIABILITY IN METERS.

WESTWOOD & WRIGHTS LTD.
Round Oak, Brierley Hill, Staffs. T/N 7101-2. T/A Westwood Wrights, Brierley Hill.
GAS & CONSTRUCTIONAL ENGINEERS.

CHARLES WINN & CO., LTD.
Granville Street, Birmingham, 1. T/N Midland 3695 (4 lines). T/A Winn, Birmingham.
BACK PRESSURE GAS VALVES, SIZES 1 in. to 12 in. FOR USE WITH AIR BLAST IN INDUSTRIAL AND OTHER GAS-HEATED APPARATUS.

GRIFFITHS BROS. & CO. LTD.
Mack's Road, Bermondsey, London, S.E. 16. T/N BERmondsey 1151. T/A London Aquol, Phone, London.
Paint, Enamel and Insulating Varnish Specialists. "FERRODOR" Metal Protection for protecting Gasholders and other Structural Works from the ravages of Corrosion.

FOR
GAS METERS write
DAVID GRANT & COMPANY
East Crosscauseway, Edinburgh 8. Tel. 41574.
Stockport Road, Manchester 19. Tel. Rusholme 1754.

E. E.
JEAVONS & CO. LTD.
TIPTON
Contractors for
GAS DISTRIBUTION
Telephone: TIP. 1621 Telegrams: "PIPELINES"

If you need
PRESSURE DIECASTINGS
in Zinc Base Alloy
enquire of **GILLS PRESSURE CASTINGS**
215 Tyburn Road, Erdington
Birmingham, 24
Telephone EAST 1008
Formerly Die-Casting Department of H. GILL STAMPINGS Limited